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TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 8.] 1916. [No. 3.

CHOLERA.

FLU (C.). **Epidemiologische studiën over de cholera te Batavia, 1909-1915.** [Epidemiological Studies on Cholera in Batavia, 1909–1915.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1915. Vol. 55. No. 6. pp. 863–925. With 3 charts.

A detailed and extremely interesting discussion of the course and causes of the various outbreaks of cholera occurring in Batavia during a period of six years, together with the results of experiments carried out to establish the importance of flies as distributors of the disease, the frequency of cholera carriers and the longevity of *V. cholerae* in water and on articles of food. In three charts are plotted curves representing cholera cases, rain and height of river—monthly observations for the whole six years and daily observations for two selected years.

The following series of the writer's conclusions, with the addition of statements and tables from the paper that precedes it, gives a summary.

1. Great periodicity is observed in the epidemic outbursts of cholera ; the dry seasons favour them while during the rainy seasons only sporadic cases occur.

2. Rain acts in many ways against a spread of the disease, mechanically washing the superficially soiled earth, cleansing the streams, destroying the breeding places of flies, shortening the life of cholera vibrios present in the ground by inducing a greater biological activity (during the dry season the protozoa and bacteria of the soil are very greatly reduced in numbers and can affect alien organisms to but slight extent ; the writer found *V. cholerae* had in earth an average life of two days in the rainy season as against four days inthe dry. season), diluting the infective material which reaches the stream A single heavy shower on the other hand may increase the risks of infection, as the charts seem to show, for while not enough rain falls to revive the biological activity of the soil and to decrease effectively the number of flies, infectious material can be swept into and thus pollute streams which at the same time do not receive enough water to cleanse them.

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3. The periodicity of epidemics also stands in relationship to the immunisation which each outbreak of cholera effects in the population, an immunisation lasting apparently six months during which time very few cases of cholera occur and then mainly among new comers, who presumably have not withstood a recent cholera epidemic.

4. Although the soil and the water of streams play considerable rôles in cholera epidemics and although at one time of the year (the dry season) cholera organisms are able to survive in the soil for a longer period, no specific influence can be said to be exerted by either soil or water.

5. Neither in river water nor in the soil nor in the alimentary canal or on the feet of flies can cholera vibrios exist saprophytically. The following table shows the result of infecting some 40 litres of river water with 5 cc. of rice water stools on June 24th :—

Date of examination.	Quantity of water or mud examined and the result.			
	1 cc. water.	5 cc. water.	50 cc. water.	100 cc. water.
24th June ..	+	+	+	+
28th June ..	—	—	—	—
30th June ..	—	—	—	—
2nd July ..	In ca. 100 and 300 cc. of mud from the bottom of the aquarium : no *V. cholerae*.			
4th July ..	In 300 and 500 cc. mud : no *V. cholerae*.			

The short life of *V. cholerae* in water in Batavia is further exemplified by the result of examining some 72 water samples taken in the neighbourhood of cholera cases ; here in spite of the manifestly big opportunities for infection only five of the 72 gave positive returns, as much as 1 litre being needed for examination in some cases before a positive result was obtained. Of 22 wells only one was found infected. As the natives allow the river water to stand in large jars for at least three days to clarify, it would appear that apart from the danger during bathing in the streams when the mouth is rinsed and no doubt water often swallowed, the importance of cholera infected water is not as great as it might be thought.

Although flies do not harbour living vibrios for long, their potential danger can be judged by the fact that in 10 out of 20 houses containing cholera cases flies infected with *V. cholerae* were caught.

6. The various epidemics that occur in Batavia are, therefore, not connected one with the other across the cholera-free periods by means of a saprophytic survival of cholera vibrios in or on the ground, the bodies of flies or in water. As the connecting links must be regarded those sporadic and slight cases which, if a sufficiently thorough search is made, are found to occur from time to time during the so-called cholera-free season.

7. The place where cholera vibrios survive for longer periods is the human intestine and, in particular, the intestinal tract of those who have withstood an attack of cholera and become chronic carriers.

8. Probably as in the case of typhoid fever, an infection of the biliary passages is the cause of the carrier-state.

H. Schütze.

FLU (P. C.). **De levensduur van choleravibrionen in en op den grond van "Cholerakampongs" te Batavia, en de bodemtheorie der cholera asiatica van Max Pettenkofer.** [The Longevity of Cholera Vibrios in and on the Earth of Batavian Cholera Kampongs, and Pettenkofer's Cholera Theory.—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1915. Vol. 55. No. 6. pp. 629–666.

For his experiments the author chose a kampong in Batavia where cholera occurred regularly and with severity, and here in a cemetery marked off a portion of ground which by means of wire netting and a guard was kept free from contamination by animal or man and by a light roofing was protected from the direct rays of the sun.

The experiments were carried out to ascertain the length of life in the earth (on the surface and at a depth of about 15 cm.) of cholera vibrios at various seasons of the year and to show whether after a sojourn in ground which may be taken, in reference both to time and place, to be "disposed" to cholera, the vibrios now possessed the increased capacity for the reduction of nitrates which EMMERICH claimed for them in elucidating PETTENKOFER'S theory of cholera.

The technique of the author's longevity experiments was as follows: The earth was sown with agar cultures of *V. cholerae* emulsified in broth; earth-samples, when taken, were put into flasks containing 50 cc. oxgall to which subsequently in the laboratory 200 cc. 1 per cent. alkaline peptone water was added; after six hours' incubation Dieudonné plates were made and if on the following day found sterile the now 24 hours' old oxgall enrichment flask was inoculated on to peptone water and following that on to Dieudonné as a final test for the presence of the comma bacillus. It may be mentioned here that none of these cholera vibrios recovered from the earth was found to be altered in agglutinability at all.

The first experiments were carried out in the second half of April between the times of the West and East Monsoons; rain fell occasionally, the soil was damp and no cholera cases had occurred during or for some time after the experiments; the ground might therefore according to PETTENKOFER be declared locally but not temporarily "disposed" to cholera. It was found that after three days samples taken from the surface of infected land or at a depth of 15 cm. no longer contained living cholera organisms, though other bacteria, amoebae, flagellates, etc., flourished in the peptone water. In May after a fair amount of rain the same result was obtained, whereas in October after a long period of drought and with the ground thus rendered very dry cholera vibrios did not disappear until the fifth day. The experiment was repeated using rice water stools as infecting agent (there were cholera cases now and the ground was to be regarded from PETTENKOFER'S stand-point as "disposed" with regard to both time and place). The vibrios disappeared by the fourth day.

On November 1st and 2nd the first rains fell. On the 5th land was infected, half being moistened with tap water every day; in both sections the comma bacillus died out by the 7th day.

The author sees in the increased longevity of cholera vibrios in the earth during the East Monsoon one reason why at that time cholera cases are more frequent and puts the prolongation of life down to the

fact that during the hot dry season the bacteria and protozoa of the earth have to a large extent been killed off and cannot therefore suppress the infecting vibrios so quickly; in the wet West Monsoon season, in addition, possibly infective stools are more speedily washed away by the rains and so disposed of.

To test EMMERICH'S theory of an increase in nitrate reducing power acquired by vibrios after a sojourn in temporarily and locally "disposed" earth, the author first examined in this respect the colonies obtained on the Dieudonné plates in the previous experiments. He acknowledges that he was not examining vibrios direct from the earth as EMMERICH did, but decides that if EMMERICH'S vibrios with raised virulence are to cause infection by being carried by flies to foodstuffs and so to human beings, the one subculture on Dieudonné should be no flaw in his experiment. The results of the one experiment given in which all subcultures into nitrate broth from the Dieudonné plates proved to be *V. cholerae* in pure culture are shown in the table on page 155.

The author then repeated EMMERICH'S experiment with earth sterilised at two atmospheres pressure for 20 minutes and an imitation subsoil-water arranged in flasks and tubes. Samples of this earth (100 mgm.) were taken six days after infection with *V. cholerae* and used for sowing nitrate broth. Here a great increase in nitrate production was observed, but was traceable by the author to denitrifying bacteria which had withstood the sterilising and not to cholera vibrios at all. A subsequent experiment on the same lines but in which the earth was heated on three successive days for 20 minutes at two atmospheres pressure and complete sterility achieved, gave very different results which are reproduced in the following table :—

Time of growth of vibrios in 1% nitrate broth.	N_2O_3 produced by the cholera strain originally.	N_2O_3 in mgms. produced by cholera vibrios after.		
		6 days in earth A.	6 days in earth B.	6 days in earth C.
1 day ..	2 mg.	3·0	1·2	2·5
2 days ..	2 ,,	3·2	3·4	4·0
3 days ..	3·2 ,,	5·2	6·8	4·3
4 days ..	5·5 ,,	5·6	8·8	6·8

These experiments, according to the author, indicate that an increased capacity for nitrate reduction is not acquired by cholera vibrios after a sojourn in earth and, as EMMERICH apparently did not test his nitrate broth for the purity of the cholera growth in it, he is inclined to think that EMMERICH obtained his results owing to 20 minutes at two atmospheres pressure not having sufficed to sterilise the earth completely, denitrifying earth bacteria remaining alive.

The paper closes with the following conclusions :—

1. Earth, even when locally and temporarily "disposed" to cholera, does not play the specific rôle in a cholera epidemic that PETTENKOFER assigned to it.

Time of growth of vibrios in 1% nitrate broth.	N_2O_3 produced by the cholera strain originally.	N_2O_3 in mgs. produced by *V. cholerae* after its reisolation from locally and temporarily "disposed" earth.											
		After a sojourn there of						After a sojourn there of					
		1 day.	2 days.	3 days.	4 days.	5 days.	6 days.	1 day.	2 days.	3 days.	4 days.	5 days.	6 days.
1 day ..	1·4 mg.	2	1·4	2·1	2·3	2·3	1·7	1·2	1·1	1·8	1·1	0·6	0·4
2 days ..	1·8 ,,	3	2	2·5	3·6	3·0	2·7	2·2	1·5	2·1	2·1	1·2	1·0
4 days ..	4·4 ,,	5·7	4·2	4·3	4·3	4·4	4·9	3·5	3·3	4·4	4·0	3·5	3·0
5 days ..	6·4 ,,	6·0	5·3	8·5	7·7	6.2	7·0	4·0	4·9	6·6	5·0	5·3	4·5

2. In Batavia cholera vibrios poured over the surface of the ground remained longer alive during the East Monsoon than during the West Monsoon, but an increase in their numbers cannot be said to occur.

3. The nitrate reducing power of *V. cholerae* is not altered by a sojourn in earth both " disposed " and containing nitrates.

H. S.

BAERTHLEIN (Karl) & GRUENBAUM (Edgar). **Ueber Seuchenbekämpfung, insbesondere Cholerabekämpfung.** [The Campaign against Epidemics, in particular Cholera.]—*München. Med. Woch.* 1916. Mar. 21. Vol. 63. No. 12. pp. 436–439.

A report of the organisation employed at the Hammerstein camp through which prisoners from the German east front have to pass on their way to more permanent quarters. A Russian medical man scrutinises the men as they come in and suspects are segregated subsequently into a number of groups according to the nature of their illness. Further any men who admit to having had cholera within the last two years or diarrhoea of any kind within the last few weeks, are sent for examination as possible carriers of cholera, etc. The remaining men are brought first into temporary quarters, until freed from vermin when they are placed in the " clean " huts and receive various (including cholera) prophylactic inoculations.

The diagnosis of cholera was carried out by inoculation on to Baerthlein and Gildermeister's modification of Dieudonné [this *Bulletin*, Vol. 6, p. 496] direct as well as after a preliminary enrichment in peptone water, so that diagnosis is established in some cases after 12 hours, in others after 36 hours.

Aberrant cholera colonies were observed and regarded by the authors as mutation forms. This type of colony was of very small size, reaching only th to ⅓rd the size of a normal one and remained constant through many subcultures on a variety of solid media. Only by using Baerthlein's method of prolonged culture in broth with subsequent inoculation on to a good cholera medium was it possible to induce a return to typical cholera growth.

The cholera infection in each new batch of prisoners was by the methods employed quickly stamped out, the last cases, which were generally only carriers, being received about eight days after the arrival of the contingent. The authors consider the cholera inoculations chiefly responsible for this, but recognise also the increased resistance to disease the men would acquire from the better conditions prevalent in camp as compared with those on the field of battle.

The so-called cholera-typhoid, in which a general toxaemia predominates, is discussed and limited to those cases displaying symptoms of a typhoidal nature without an increase in temperature ; where the temperature rises the authors have almost always found that a secondary infection has taken place—typhoid, malaria or gonorrhoea.

Cholera vibrios persisted in carriers for one or two to 16 days, only

in two cases for longer periods, viz: 47 and 52 days. The following table, in which unfortunately no absolute numbers of cases are given, shows the beneficial effect of cholera inoculation and also the interesting effect that the majority of carriers occurred among the fully inoculated. In explanation of this, the writers suggest that as inoculation may convert what would have been a severe infection into a slight one, so what might have been a slight infection may be entirely avoided and only a carrier state result. The shortness of time for which the condition lasts, would indicate that any marked danger of inoculation veiling infection indefinitely and so leading to a spread of the disease does not exist.

Cholera cases.	Percentage.	Insufficiently and uninoculated.	Fully inoculated.
Dead	7·7	78·9%	21·1%
Diarrhoea and vomiting..	19·5	79·8%	20·2%
Diarrhoea with occasional vomiting	47·8	61·4%	38·6%
Carriers	24·8	29·5%	70·5%

H. S.

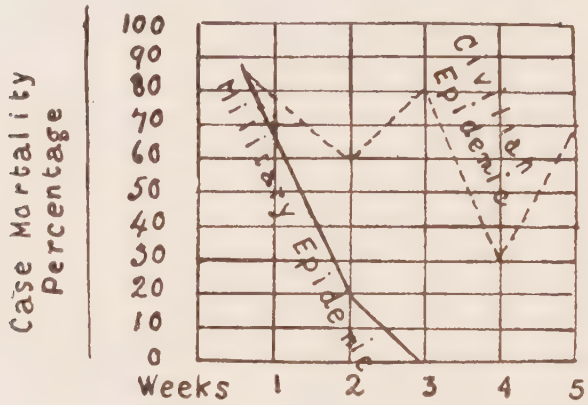
FRANKL (S.) & WENGRAF (F.). **Ueber die Choleraepidemie in Brčka Juni bis Juli 1915.** [A Cholera Epidemic at Brčka.]—*Wien. Klin. Woch.* 1915. Dec. 9. Vol. 28. No. 49. pp. 1346–1348. With a chart.

A description of an outbreak of cholera in Brčka, a town in North Bosnia frequently subject to epidemics but not visited by one during this war until June of 1915, when the disease was introduced by troops temporarily billeted there. The interest of the paper lies in the fact that the military of the town were all inoculated against cholera and the civilians practically not at all. The soldiers however, after the epidemic had been recognised as such, were segregated and the author does not bring proof that the two groups continued to live under similar conditions or were similar in other respects apart from the question of inoculation. His figures are:—

Military (inoculated) had 30 cases with a mortality of 30 per cent.
Civilians (uninoculated) „ 78 „ „ „ 73·4 „

It was interesting to note of these 30 inoculated cases that 23 with a mortality of ca. 35 per cent. occurred in men inoculated five months previously, while seven with a mortality of only ca. 14 per cent. occurred in men inoculated in the same month of the outbreak.

At the beginning of the epidemic the cases were severe and the mortality high even amongst the inoculated but, as the following table shows, the severity of the disease diminished.



The author considers it possible this indicates that the cholera vibrios lost in virulence, when passing through a series of persons, more rapidly when these were inoculated than when uninoculated. In connection with this hypothesis, it was noted that strains isolated from convalescents, military carriers and light cases towards the end of the epidemic were sometimes bad agglutinators, though normal in other respects and well agglutinable at an earlier stage of the patient's illness.

H. S.

Violle (H.). **De la pathogénie du Choléra.**—*Ann. Inst. Pasteur.* 1916. Apr. Vol. 30. No. 4. pp. 160–162.

The author has shown in previous papers [this *Bulletin*, Vol. 6, p. 41] that *V. cholerae* administered per os will with difficulty multiply in the intestine and cause disease unless the flow of bile is interrupted. He here attempts an explanation of this phenomenon.

He finds that while *V. cholerae* can ferment carbohydrates and acts to a limited extent on proteins, on fat there is no action. In the same way bile alone has no effect on fat, though the two acting together are able to decompose it. The writer suggests that this interdependent action is that of a ferment (in the vibrio) and a catalytic substance (in the bile). Should there be a plentiful flow of bile, vibrios arriving in the intestine would split the fats of the food and thus threaten their own existence by reason of the acid produced. Conversely should the bile supply fail, the way would be open for a multiplication of the vibrio in the small intestine.

H. S.

Coulter (J. S.). **A Study of the Pathology of the Gall Bladder and Biliary Passages in Cholera.**—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1915. Nov. Vol. 10. No. 6. pp. 385–389.

The following table summarises the result of the autopsies on cholera as reported by the writer :—

Table I.

Showing condition of the gall bladder and biliary passages.

Year.	Cholera autopsies.	Signs of Inflammation.		Stones.
		Gall bladder.	Bile ducts.	
1908	108	.....	1	.....
1909	123	1	.....	.....
1910	98	.....	.....	2
1911	1	.....	.....	.....
1912	0	.....	.....	.....
1913	79	3	.....	.....
1914	226	*8		2
Total ..	635	12	1	4

* "Thirty-nine of the gall bladders in the 1913–14 series at the time of autopsy were tied off at the common duct and sent to the Bureau of Science, Manila, where they were examined by Dr. Otto Schöbl. He records his results in a recent paper. The cholera vibrio was found in 17 of the cases on bacteriological examination of the bile. Three cases showed microscopic pathological changes in the gall bladder, and in two hydrops cystis felleae was found—that is, distend d gall bladder containing mucus, bile of light amber color, and flaky sediment. One showed thickening of the wall with distended blood vessels, desquamation of the mucosa, and round-cell infiltration."

H. S.

McLaughlin (Allen J.). **Practical Points in the Prevention of Asiatic Cholera.**—*Milit. Surgeon.* 1916. Jan. Vol. 38. No. 1. pp. 22–29: and *Boston Med. & Surg. Jl.* 1916. Apr. 6. Vol. 174. No. 14. pp. 483–486.

Two reviews on the importance of cholera carriers in relation to the spread of that disease with descriptions of the usual methods of diagnosis, Goldberger's alkaline egg peptone and alkaline meat infusion peptone being recommended selective media.

H. S.

Hoppe-Seyler (G.). **Zur Kenntnis der Cholera und ihrer Verschleppung.** [Cholera Infections].—*München. Med. Woch.* 1916. Apr. 11. Vol. 63. No. 15. pp. 542–544.

An account of a few cases of cholera that were found in Kiel in September and October of 1915. The vibrio isolated had in all cases the unusual characteristic of being haemolytic. The writer suggests that this would indicate a common source of infection and points out that in Poland (in relationship with which country some of the cases stood) this type is not so uncommon.

H. S.

Cox (Stafford M.). **Abstract of an Address on the Prevention and Treatment of Cholera. Delivered before a Medical Conference in Malta.**—*Lancet.* 1916. July 1. pp. 3–6. With 2 figs.

After pointing out the importance of inoculation as a preventive measure, the writer urges the necessity of segregation and a week's detention of cholera contacts with observation of those released for a further week. With regard to treatment, he does not think cholera serum of use. In earlier years his intravenous injections were of isotonic saline and larger in amount than the hypertonic saline injections of Rogers. He compares his results with those of that worker, as follows :—

India.	China.
Rogers, 1910 and part 1909.	Cox, 1909.
Collapse stage cases only.	Collapse stage cases only.
Number of cases, 103.	Number of cases, 666.
Average amount injected 4½ pints.	Average amount injected 13 pints.
Mortality, 32 per cent.	Mortality, 18·8 per cent.

The author's cases developed "transfusion rigors" after more than five pints had been injected and he found morphia and belladonna (¼ gr. each) and hot bottles of use at that stage.

More recently he has gone over to hypertonic saline and gives on the average 8½ pints.

A slow continuous infusion (ca. 2 oz. per minute) kept at a uniform temperature is employed; boiled water is used in the absence of distilled, a Berkefeld filter being interposed in the transfusion apparatus.

H. S.

Rogers (Leonard). i. **Further Work on the Reduction of the Alkalinity of the Blood in Cholera; and Sodium Bicarbonate Injections in the Prevention of Uraemia.** ii. **With a Note on the Technique of the Estimations of the Alkalinity of the Blood by** Satis Chandra Banerjee.—*Ann. Trop. Med. & Parasit.* 1916. Apr. 29. Vol. 10. No. 1. pp. 139–152.

i. The author's treatment of cholera now includes the giving of alkalies intravenously and is based on observations of the alkalinity and specific gravity of the blood in over 100 cases of cholera.

The relationship between reduction of alkalinity of the blood and severity of disease on the one hand and rise in sp. gr. of the blood on the other hand is clearly shown in the following two tables and confirms the view that the dangerous post-choleraic uraemia is, as Sellards suggested, due to an acidosis.

Table II.—The Relationship of the Specific Gravity of the Blood on admission and the Alkalinity.

Alkalinity.	Specific gravity below 1060.				Specific gravity 1060–1063.				Specific gravity 1064–1065.				Specific gravity over 1065.			
	Cured.	Died.	Total.		Cured.	Died.	Total		Cured.	Died.	Total.		Cured.	Died.	Total.	
Over N/45 ..	4	–	4		8	1	9		5	1	6		4	1	5	
N/45–N/60 ..	4	1	5	16 80%	7	1	8	21 75%	2	1	3	16 69·6%	8	–	8	20 60·6%.
N/60–N/80 ..	7	–	7		2	2	4		6	1	7		6	1	7	
N/80–N/100..	–	–	–	4 20%	3	2	5	7 25%	3	1	4	7 30·4%	10	2	12	13 39·4%.
N/100 and less	–	4	4		–	2	2		3	–	3		1	–	1	
Total ..	15	5	20		20	8	28		19	4	23		29	4	33	

TABLE I.—The Degrees of Reduction of the Alkalinity and the Causes of Death in 104 Cholera cases.

Alkalinity.	Cured.	Died.			Total deaths.	Total cases.	Percentage of deaths.	Percentage.		
		Collapse.	Uraemia.	Other causes.						
Over N/45 ..	21	1	1	1	3	24	12·5	23·1		
N/45–N/60 ..	21	3	–	–	3	24	12·5	23·1		
N/60–N/80 ..	21	2	1	–	3	24	12·5	23·1		
N/80–N/100..	16	4	1	1	6	22	27·3	21·1	30·7	53·8 / 76·9
N/100 and less	4	2	4	–	6	10	60·0	9·6		
Totals ..	83	12	7	2	21	104				

With regard to the administration of the alkali, the method chosen by the writer was as follows :—All cases admitted on the first day of illness receive hypertonic saline ; if a second, third, etc., injection is necessary, the patient receives first 1 pint of alkaline fluid (160 gr. of sod. carb. + 60 gr. sod. chloride) with as much more hypertonic saline to follow as the case needs ; in cases admitted later than the first day of illness and with suppression of urine the alkali is given with the first injection. The sod. carb. is sterilised in the solid to avoid chemical alteration.

ii. Titration of the blood is carried out with capillary volumes of sulphuric acid, $\frac{n}{25} - \frac{n}{80}$ or in greater dilution if required, and serum, mixing on a glass slide and testing with litmus paper to establish which strength of acid gives neutrality. It is important that the glass capsules in which the blood is taken up, should be freed from alkali by washing with dilute sulphuric and distilled water and carefully dried, the ends being sealed with sealing wax and not by heat for centrifuging purposes.

H. S.

ADLER (Oskar). **Die Behandlung der Cholera asiatica im Felde.** [Cholera Therapy during Active Service.]—*Wien. Klin. Woch.* 1916. Feb. 3. Vol. 29. No. 5. pp. 123–128.

The author describes the chief therapeutical measures adopted by him in his mobile laboratory ; these laboratories were apparently provided to the Austrian army, were staffed by one to two specially trained medical men, five nurses trained to epidemiological work and attendants, and were generally placed about seven miles behind the front. Where cholera was to be feared, all suspected cases were treated immediately without waiting for a bacteriological diagnosis.

Unless a case was so slight and of such a character that a very mild course could be predicted, or was so severe that the heart was failing, the author's object was to get rid of toxins already formed in the gastro-intestinal tract and to this end he washed out both stomach and rectum with a warm (42° C) animal charcoal suspension (5 gm. to the liter) after giving 2–3 cc. camphor subcutaneously. The stomach being empty after the last washing 5 gm. animal charcoal in a glass of water is administered and further charcoal suspension given to sip, the patient receiving 25–30 gm. per day. This treatment can be carried out entirely by the nurses. The author considers animal charcoal much better than bolus alba for the absorption of toxins.

In severe cases, although charcoal suspension may be given by the mouth, no washing out is performed and chief reliance is placed on the intravenous administration of 3 per cent. saline with 1 cc. digalen and 2 cc. camphor per liter added. The patient is kept in a warmed bed as in the less severe cases.

In comatose cases and those where the chief toxic effect seems to be exerted on the central nervous system, the author has begun to perform lumbar puncture to relieve pressure and to wash out the spinal canal with warm physiological saline to remove toxins.

H. S.

Kausch. **Traubenzuckerinfusion bei Cholera.** [Dextrose Injections in Cholera.]—*München. Med. Woch.* 1916. Apr. 11. Vol. 63. No. 15. pp. 544–545.

A recommendation of the use of dextrose injections in cholera. The writer uses a 5 per cent. solution in water for subcutaneous and a 10 per cent. solution for intravenous injections. He does not consider exact isotonicity very necessary, particularly for intravenous use where almost immediate mixing with the blood takes place. Whether the good effects are to be ascribed mainly to the washing out of toxins, to the replenishment of the body with water, or to the nutritive sugar, the writer is unable to say.

H. S.

Mueller (Otto). **Injektionen mit Hypophysisextrakt und Gelatine gegen Cholera.** [Pituitary Body and Gelatine Injections in Cholera.]—*Wien. Med. Woch.* 1916. Feb. 19. Vol. 66. No. 8. pp. 300–305.

After putting forward a plea for the consideration of cholera as in the main an enteritis with only the possibility of a supervening specific intoxication, the writer goes on to describe his therapy, practised apparently on but eleven cases. He regards the first symptoms of most cholera cases to be due to paralysis of the splanchnic nerve brought about by the growth of the vibrios on the intestinal walls. It is the resulting visceral hyperaemia with the attendant anaemia in other parts of the body which has to be treated. Calomel is given if

stools are not sufficiently frequent, and gelatine (1–2 gm. a day intramuscularly) to increase the viscosity of the blood, and pituitary gland (in bad cases intramuscularly, in convalescents subcutaneously) to raise the blood pressure. Intravenous saline injections are, however, not omitted from the therapy.

H. S.

Marassini (Alberto). **Sopra un nuovo metodo di ricerca e di isolamento del Vibrione colerigeno nelle feci.** [A New Method for the Isolation of *V. cholerae* from Faeces.]—*Gaz. Ospedali e d. Clin.* 1916. Jan. 16. Vol. 37. No. 5. pp. 67–68.

A slight modification of Aronson's cholera medium [this *Bulletin*, Vol. 6, p. 495] which the author considers, without however giving any reasons for or proof of his opinion, to be an improvement. As far as can be gathered the ingredients are the same, but a 30 per cent. dextrin solution is substituted for Aronson's 20 per cent. one and 25–30 cc. of 10 per cent. Sod. Carb. [? sicc.] are added per 100 cc. agar instead of 6 cc.

H. S.

Segale (Mario). **Metodiche di accertamento batteriologico su vasta scala. Nota I.—Portatori di colera e terreno Aronson.** [Bacteriological Diagnosis on a Large Scale. I.—Cholera Carriers and Aronson's Medium.]—*Giorn. di Med. Milit.* 1916. Feb. 29. Vol. 64. No. 2. pp. 98–104.

The author's chief labour saving modification in the examination of large numbers of carrier stools was not to examine the colonies that have grown on the Dieudonné plates after their inoculation from the peptone water enrichment medium, but to plate from Dieudonné on to Aronson's sugar medium. In this way the number of microscopical examinations is greatly reduced. He found that while 500 stool specimens might give 100 Dieudonné plates showing growth, of these 100, 60–70 might be cut out by a further plating on to Aronson, leaving only 30–40 to be examined microscopically for the necessity of an agglutination test.

A further device for the saving of time and trouble was to send the peptone water tubes to the quarantine stations for direct inoculation from the faeces passed; extra manipulations, washings and possible confusions are thus avoided. [In this he follows Otto (this *Bulletin*, Vol. 6, p. 498.)]

H. S.

Seiffert (G.) & Bamberger (H.). **Elektive Cholera-Nährböden.** [Selective Cholera Media.]—*München. Med. Woch.* 1916. Apr. 11. Vol. 63. No. 15. pp. 527–528.

In an attempt to combine the good qualities of Aronson's and Dieudonné's cholera media, as haemoglobin was useless owing to its colour interfering with the fuchsin indicator of Aronson's medium, on

the strength of Ottolenghi's observations, the authors added bile instead. It was found that while the addition of bile to Aronson both inhibited the intestinal flora and favoured the growth of *V. cholerae*, the bile itself was very variable, some samples actually inhibiting *V. cholerae* so that a preliminary testing of it would be required in every case.

As pyrrole is to be regarded as a foundation stone of chlorophyll as well as of haemoglobin and the bile salts, this substance was examined as to its suitability. The medium was prepared by adding 25 cc. of an alcoholic chlorophyll solution (Merk's Solutio spirituoso or Extractum urticae spissum) to 60 cc. of 10 per cent. anhydrous Sod. Carb., steaming for one hour ; 50 cc. of a sterile 20 per cent. dextrin solution and 50 cc. of a sterile 20 per cent. cane sugar solution are added and all mixed with 1 liter of neutral agar ; before use 4 cc. of saturated alcoholic fuchsin is added, then drop-wise a freshly prepared 10 per cent. sod. sulphite solution until decolorisation (about 15 cc. necessary). The plates are dried open and are at once ready for use. This chlorophyll medium should be freshly prepared and poured as soon as mixed as repeated heating darkens it and renders it less selective. Fifty stools were tested on the three media for their power of inhibiting intestinal bacteria.

	On Dieudonné.	On Aronson.	On chlorophyll medium.
Growth.. ..	46%	98%	40%
No growth in ..	54%	2%	60%

Stools artificially infected with cholera could be diagnosed on chlorophyll agar in a dilution at which it was not always possible to do so with Aronson. Morphologically and serologically the vibrios were not altered after cultivation on the new medium.

H. S.

Volpino (G.). **L'uso del terreno di Aronson nella diagnosi rapida del vibrione colerigeno.** [Aronson's Cholera Medium.]—*Policlinico. Sez. Prat.* 1916. Apr. 30. Vol. 23. No. 18. pp. 549–551.

The writer recommends plating on to Aronson after an 8–10 hours enrichment in 1 per cent. peptone water and examination on the following morning of *all* colonies in smears under the microscope and by the agglutination method, as he does not find that *V. cholerae* can always be depended upon to produce red colonies by that time. For this reason he considers ordinary agar of equal alkalinity almost as good as Aronson for rapid diagnosis. Alternative methods are (1) two peptone water enrichments, the first from morning to evening, the second from evening to morning, with smear and agglutination examinations and plating on to Aronson in the doubtful cases ; (2) smear examination after one peptone water enrichment, a second enrichment

or plating on to agar only in those cases where vibrios have been seen, with microscopic and agglutination examination of the colonies that develop here. This last method required a particularly well trained and discriminating observer.

H. S.

Sampietro (G.). **La diagnosi rapida del vibrioni colerigeno con il metodo Bandi.** [Bandi's Method of Rapid Cholera Diagnosis.]—*Ann. d'Igiene.* 1916. May 31. Vol. 26. No. 5. pp, 305–309.

After pointing out the drawbacks to the use of Aronson's cholera medium, the writer recommends the use of Bandi's [unfortunately without supplying details of any comparative examinations].

Bandi's method is to inoculate the suspected faeces into peptone water containing cholera agglutinating serum of such a strength that while group agglutinations are avoided, the serum may be relied upon to clump *V. cholerae.* The controls consist of an inoculation into peptone water without the addition of agglutinating serum and if desired, a known cholera strain is inoculated into peptone water with and without serum. After as short a time as three and even two hours agglutination of the multiplying cholera vibrios is plainly visible to the naked eye in the positive cases. A microscopic examination of such cases is then carried out in confirmation.

For carrier examinations a modification of the method is advisable. In the first place the faeces will doubtless be formed and may emulsify badly, thus masking or simulating a positive result; secondly such examinations are generally carried out on large numbers of cases, leading to great expenditure of serum. A preliminary and ordinary peptone water culture is therefore made from the faeces specimens and these are looked through after periods up to 12 hours. Those cases without vibrios are not proceeded with; those with vibrios are inoculated into peptone water containing cholera serum of two or three times its titre strength and also into peptone water without serum, and agglutination looked for after two hours or so. Thus even in these cases the author claims a diagnosis can be obtained in 14 hours.

H. S.

Teague (Oscar) & Travis (W. C.). **A New Differential Culture Medium for the Cholera Vibrio.**—*Jl. Infect. Dis.* 1916. June. Vol. 18. No. 6. pp. 601–605. With 1 plate.

A description of a nutrose saccharose agar medium with colour contrast due to the addition of eosin and bismarck-brown, cholera and cholera-like vibrios growing in colonies with dark brown centres. No evidence of any superiority is brought forward.

H. S.

Ghedini (G.). **A proposito del terreno di Dieudonné.** [Dieudonné's Medium.]—*Pathologica.* 1916. June 15. Vol. 8. No. 183. pp. 191–192.

The writer urges that Dieudonné's cholera medium be not abandoned for newer kinds. He suggests two modifications in its preparation :— (1) the titration of the blood after laking with KOH, further alkali being added if the free amount present does not reach 45 per 100 ; (2) the use of alkaline agar (5·5 per cent. alkali) in the place of ordinary agar. The degree of alkalinity that should now result (25 per 100) assures particularly good selectivity to the medium. H. S.

Greig (E. D. W.). i. **Further Observations on Lesions of the Biliary Passages of Rabbits dying after Repeated Intravenous Injections of Living Vibrios : A Contribution to the Study of Experimental Cholera Infection.**—*Indian Jl. Med. Res.* 1916. Jan. Vol. 3. No. 3. pp. 397–441. With 1 plate and 1 chart.

ii. **On the Alteration in Serological and Morphological Characters of a Strain of Vibrio.**—*Ibid.* pp. 442–453. With 2 charts and 1 plate.

i. The author continues [this *Bulletin*, Vol. 7, p. 249] his examination of rabbits dying after repeated intravenous injections of living cholera-like vibrios (one case true *V. cholerae*). Of 19 rabbits dead after a prolonged (generally between three and nine months) course of inoculations, 16 showed signs of cholecystitis and nine were found to have calculi in the gall bladder, this organ yielding the vibrios in pure culture ; on crushing the stones, vibrios were found in the interior in two cases.

Cholecystitis with or without calculi would thus appear to be a frequent cause of death and the writer suggests that the sickness and loss of weight that occurred in a number of cases, recovery subsequently taking place, were very probably due to an attack of cholecystitis.

Two of the rabbits were found to have been carriers for periods of 15 months and one for a period of four weeks, those times having elapsed since the last inoculation and living vibrios having been recovered from the gall bladder at death. The protocols of all the animals are given in full and two charts, which show a very marked rise in the agglutinin titre of two rabbits, occurring after sickness and loss of weight in the animals, which the author suggests were signs of cholecystitis.

ii. In every case but one, the vibrio isolated from the gall-bladder of an inoculated rabbit corresponded serologically to the strain injected ; the exception is described as follows.

The vibrio used for inoculation here was a cholera-like one, isolated from a water tank in the neighbourhood of which cholera cases were at the time occurring. Intravenous inoculation was carried out some 12 times during a period of over two months, the animal dying after the last inoculation. On recovery from the gall bladder the strain was now however seen to differ from that inoculated in a number of respects. The organism was shorter, approximating more to the morphology of the Koch comma bacillus. As the following tables explain, there was serologically also an approximation to the true cholera vibrio and a distinct want of agreement with the injected strain.

Table III. shows the result of the Widal reaction with a high titre agglutinating serum (Vibrio W. 1 orig.) and the vibrio isolated from bile of Rabbit No. 152, W. 1 (bile), and W. 1 (orig.) and standard cholera vibrios :—

	Widal reaction with high titre (1 : 10,000) agglutinating serum (vibrio W. 1 (orig.)).				
	1 : 20	1 : 100	1 : 500	1 : 1,000	1 : 10,000
1. Vibrio isolated from bile of Rabbit No. 152 W. 1 (Bile)	+	—	—	—	—
2. Vibrio W. 1 (orig.) from water with which Rabbit No. 152 was immunized..	+	+	+	+	+
3. Standard cholera vibrio	—	—	—	—	—

Table IV. shows the result of Widal reaction with high titre cholera agglutinating serum (standard cholera vibrio No. 2097) and the vibrio W. 1 (bile) isolated from bile of Rabbit No. 152, and vibrio W. 1 (orig.) :—

	Widal reaction with high titre (1 : 6,000) cholera agglutinating serum (No. 2097).				
	1 : 20	1 : 100	1 : 500	1 : 1,000	1 : 6,000
1. Standard cholera vibrio No. 2097	+	+	+	+	+
2. Vibrio W. 1 (Bile) from bile of Rabbit No. 152 ..	+	+	—	—	—
3. Vibrio W. 1 (orig.) from water	—	—	—	—	—

Serum obtained by inoculation of a rabbit with the recovered strain was seen to agglutinate this recovered strain and *V. cholerae* almost equally well (1 : 6,000 and 1 : 5,000) but the original injected strain merely to 1 : 20.

The absorption tests shown in the following table also pointed to a greater similarity between *V. cholerae* and the recovered strain than between this latter and the injected organism.

Table VI. shows the date of observation, the number of the strain of cholera-like vibrio, the agglutination titre of homologous serum of rabbit, the number of the strains of cholera-like vibrio and standard cholera used to absorb the serum, the naked-eye character of the supernatant fluid after absorption, and the Widal reaction of the supernatant fluid with the original strain of cholera-like vibrio.

Col. 1.	Col. 2.	Col. 3.	Col. 4.	Col. 5.	Col. 6.					
Date of observation.	No. of strain of cholera-like vibrio.	Agglutination titre of homologous serum of rabbit used (Dil. 1 : 50).	No. of strain of cholera-like vibrios and standard cholera used to absorb serum.	Naked-eye character of supernatant fluid after absorption for 18 hours at 37° C.	Widal reaction of supernatant serum (col. 5) with original strain of cholera-like vibrio (col. 2) after absorption with the various cholera-like and standard cholera vibrio (col. 4) and after centrifugalization for 15 minutes.					
					100	200	500	1000	2000	4000
16–9–15	W. 1 (Bile)	1 : 4000 Rabbit No. 167	W. 1 (Bile)	Clear	—	—	—	—	—	—
					(Complete absorption).					
			W. 1 (original)	Turbid	+	+	+	+	+	+
					(No absorption).					
			2097 standard cholera	Partially clear	+	+	+	+	—	—
					(Partial absorption).					
			620 standard cholera	Ditto	+	+	+	+	—	—
					(Partial absorption).					

Complement deviation tests indicated a similar relationship.

The author's explanation is that the original strain was not in reality a cholera-like organism but a true cholera vibrio altered by growth in the external world and only tending to resume its true character after passage through the rabbit.

It has been usually thought that though growth in water may alter the agglutinability of cholera vibrios, the antigenic character was much more stable. If however the author's inferences are correct, *V. cholerae* has been altered in the latter respect as well—the original (? altered) strain did not on inoculation into a rabbit produce a serum capable of agglutinating *V. cholerae.*

On isolating the supposed cholera-like vibrio in the first place from water, the author had been unable to allocate it a place in any of the six groups into which he divides cholera-like vibrios ; this he regards as being another sign possibly of the vibrio not being a true cholera-like vibrio but an altered Koch bacillus. H. S.

Schoebl (Otto). **Experimental Cholera-Carriers.**—*Jl. Infect. Dis.* 1916. Mar. Vol. 18. No. 3. pp. 307–314.

The author's summary gives a good account of the work described in his paper :—

" Attempts were made to produce in animals a condition which would resemble that of cholera-carriers in human beings. Inoculations of cholera

vibrios into the gall-bladder, stomach, small intestine, blood stream, and serous cavity were made and inoculation by feeding was also tried.

"Direct inoculation into the gall-bladder, stomach, and small intestine and inoculation by feeding proved successful inasmuch as a certain percentage of the inoculated animals were found to harbour cholera vibrios in the alimentary canal. This was ascertained by bacteriologic examination of various parts of the digestive system, made in the great majority of cases immediately after death.

"The intravesicular inoculation proved to be far superior to other methods. Practically every one of the animals inoculated in this way harbored cholera vibrios.

"The duration of the condition, although limited, appears to be sufficiently long for therapeutic experiments."

The table gives an indication of the distribution and longevity of *V. cholerae* in the guinea-pig after inoculation into the gall-bladder.

TABLE I.

The Distribution of Cholera Vibrios in the Alimentary System of Guinea-pigs and the Duration of the Carrier State after Intravesicular Inoculation.

Guinea-pig.	Days after Inoculation.	Gall bladder.	Stomach.	Duodenum	Ileum.	Cecum.	Rectum.
1	1	+	0	0	+	+	0
2	2	+	0	0	+	+	0
62	3	+	—	+	+	+	0
68	3	+	—	+	+	+	0
69	3	+	+	+	+	+	+
3	4	+	0	+	+	+	0
56	4	+	—	+	+	+	+
65	4	+	0	+	+	+	—
49	5	+	—	+	+	+	—
50	5	+	—	+	+	+	—
63	5	+	—	+	+	+	—
34	6	+	—	+	+	—	—
40	6	+	0	+	+	—	—
41	6	+	0	+	+	+	—
54	6	+	—	+	+	—	—
55	6	+	—	+	+	+	—
57	6	+	—	+	+	+	—
58	6	+	—	+	+	—	—
4	7	+	—	+	+	+	—
35	7	+	—	+	+	+	—
59	7	+	—	+	+	—	—
66	8	+	—	+	+	+	—
67	8	+	—	+	+	+	—
70	8	+	—	+	+	+	—
32	10	+	—	+	+	+	—
60	10	+	—	+	+	+	—
33	11	+	—	+	+	+	—
46	13	+	—	—	+	+	—
47	13	+	—	+	+	+	—
48	13	+	—	+	+	+	—
64	16	—	—	—	—	—	—
36	17	+	—	+	+	+	—
43	30	—	—	—	—	—	—

\+ = cholera vibrios present in the culture.
— = cholera vibrios absent in the culture.
0 = not examined.

H. S.

Bail (Oskar). **Ueber das Verhalten der Cholerasubstanz im immunen Tierkörper.** [The Behaviour of Cholera Bodies in the Immune Animal.]—*Zeitschr. f. Immunitätsforsch.* 1. Teil. Orig. 1916. Mar. 4. Vol. 24. No. 4. pp. 396–410.

This very interesting paper deals with complement fixation experiments carried out with a view to explaining the want of toxicity in cholera sera. Although striking bacteriolytic and other effects are always observed on adding specific serum to cholera vibrios, their toxicity remains unaltered. The author concluded that in an animal given a mixture of this sort (serum + vibrio) free cholera bodies would be found, notwithstanding the bacteriolysis, etc., that had taken place. He directed his search to complement fixing bodies.

The experiment was varied in a number of ways—cholera immune serum being allowed to act on the vibrios before the intraperitoneal injection of the mixture, or given after the vibrios (in the manner of a curative injection), or the experiment being carried out entirely *in vitro*.

Complement fixing bodies were found in the peritoneal exudate, serum and organs of the guinea-pigs and in the saline or normal peritoneal fluid extract prepared from the vibrios treated with serum *in vitro*.

In several cases it was possible to demonstrate in the sera and exudate of treated animals cholera antibodies existing side by side with the cholera bodies and, notwithstanding the close affinity that usually exists between them, apparently not showing any great tendency to reunite.

The author concludes therefore that the combination of cholera immune bodies with the substance of the cholera organisms is not a stable or permanent one, either *in vitro* or *in vivo*, but regularly splits into its component parts.

This liberation of the cholera bodies in spite of the presence of immune serum would explain the want of antitoxic qualities in cholera immune serum. The end to aim at, therefore, in preparing a cholera serum would be to obtain one, not necessarily of great antitoxic power, but capable of entering into a permanent and therefore presumably atoxic combination with the substance of the cholera vibrio.

H. S.

Ottolenghi (D.). **La preparazione del vaccino anticolerico per le truppe.** [The Preparation of Cholera Vaccine.]—*Igiene Moderna.* 1915. Nov. Vol. 8. No. 11. 12 pp.

Here an attempt has been made to estimate the value of various types of cholera vaccine; however as but one animal, as far as one can gather, was in most cases inoculated with each vaccine, conclusions can hardly with justice be drawn. A uniform emulsion of

cholera vibrios in saline was taken and treated in the following ways :— (1) By heating to 53° and 60° for one hour ; (2) ditto but with filtration after autolysis at 37° for 24 hours ; (3) with chloroform or ether in vapour form or with ether in liquid form, the disinfectant being subsequently driven off at 37° ; (4) with hydrochloric acid 1 per mille and subsequent neutralisation with sodium carbonate ; (5) with arsenious acid ·5 per cent. ; (6) with calcium hypochlorite 0·39 per thousand ; (7) with perchloride of mercury 1 : 20000. Rabbits were inoculated subcutaneously with these variously treated vaccines and tested after seven days for agglutinins and bacteriolysins. No great difference was found to exist in the degree to which these substances had been elicited ; heating to 53° and killing with ether appeared if anything to give slightly better results and also, as shown by re-testing 20 days later, somewhat more enduring antibodies. The protective power of some of these vaccines, (1) killed at 53° ; (2) ditto with subsequent autolysis ; (3) killed with liquid ether ; (4) killed with ether vapour, was tried for guinea-pigs, by giving a lethal intraperitoneal dose of cholera seven days after inoculation. All the pigs survived except the uninoculated controls and those inoculated with the ether vapour killed vaccine, these two groups dying at about much the same time.

It would thus seem that the preparation of a cholera vaccine by heating to 53° for one hour is to be recommended as simple and effective.

H. S.

Konrádi (Daniel). **Ueber den Wert den Choleraschutzimpfungen.**—[The Value of Prophylactic Cholera Inoculation.]—*Cent. f. Bakt.* 1. Abt. Orig. 1916. Jan. 31. Vol. 77. No. 4. pp. 339–352. With 1 chart.

A paper consisting chiefly of references to well known work. The author examined a small number of cases from time to time after cholera inoculation and found the agglutinin and bacteriolysin titre of the sera rise to a maximum one to two weeks after the second inoculation and sink to almost normal again towards the end of a year.

H. S.

Zoltàn von Ajkay. **Erfahrungen über den Wert der Choleraschutzimpfung.** [Observations on the Value of Prophylactic Cholera Inoculations.]—*München. Med. Woch.* 1916. Feb. 15. Vol. 63. No. 7. pp. 251–252.

An account of a small group of cases occurring in the Austrian army during the Russian retreat in Volhynia towards the end of September 1915. Two pools were found to be infected with *V. cholerae* and a serious epidemic was feared, but of the 19 soldiers in whom the vibrio

was found, nine only carried for a few days and ten were cases of a very mild type. The writer ascribes [though without proof that the strain was not a poorly virulent one] the mildness and smallness of the epidemic to the fact that the soldiers had all been inoculated against cholera the previous May and June.

H. S.

Danila (P.) & Stroé (A.). **Recherches sur les agglutinines des vaccinés successivement contre la fièvre typhoïde et le choléra.**— *C. R. Soc. Biol.* 1916. Jan. 22. Vol. 79. No. 2. pp. 108–111.

It having been previously found [this *Bulletin*, Vol. 6, p. 501] that animals quickly lose the agglutinins produced by inoculation with *V. cholerae*, the authors made a series of agglutination determinations in some 114 soldiers inoculated twice against cholera and three times against typhoid and were able to show that, as is seen in the following table, a similar disappearance takes place here also.

Agglutination with V. cholerae.

Time since Inoculation.	Number of cases.	Serum dilution.	Results.		
			Doubtful.	Positive.	Negative.
9 days ..	20	1 : 10	2	9	9
		1 : 20	4	0	16
2 months and 8 days ..	20	1 : 10	4	6	10
		1 : 20	1	1	18
3 months ..	3	1 : 30	–	–	3
4 months ..	4	1 : 30	–	–	4
6 months ..	14	1 : 10–1 : 30	–	–	14
12 months ..	53	1 : 10–1 : 30	–	–	53

They further investigated the agglutinin content of the blood of 40 men inoculated with one type of vaccine, the polyvalent No. 1 of the table, using as antigen the homologous vaccine and three others. As will be seen, two heterologous emulsions gave absolutely negative rsults, while the living emulsion [it is not stated what relation this bears to vaccine No. 1, with which the soldiers were inoculated] on the whole gave better results than the homologous one, though there was variation from case to case.

Cholera antigen used.

Number of Case.		Living Emulsion.		Polyvalent Vaccine No. I.		Polyvalent Vaccine No. II.	Monovalent Vaccine.
		1 : 10	1 : 20	1 : 10	1 : 20	1 : 10	1 : 10
Inoculated with polyvalent vaccine No. I nine days previously	1	+++	+++	0	—	0	0
	2	++	+	0	—	0	0
	3	+	0	+++	?	0	0
	4	+++	+++	++++	?	0	0
	5	++	++	0	—	0	0
	6	+	—	?	—	0	0
	7	+	—	+	—	0	0
	8	?	—	?	—	0	0
	9	+	—	+	—	0	0
	10	0	—	0	—	0	0
	11	+	—	++	0	0	0
	12	?	—	0	—	0	0
	13	++	+	0	—	0	0
	14	+++	++	++++	?	0	0
	15	0	—	0	—	0	0
	16	0	—	0	—	0	0
	17	++	+	+++	?	0	0
	18	?	—	0	—	0	0
	19	++	++	++	0	0	0
	20	++	++	+	—	0	0
Inoculated with polyvalent vaccine No. I two months and eight days previously	21	+	—	++	?	0	0
	22	0	—	++	0	0	0
	23	0	—	++	0	0	0
	24	+	—	0	—	0	0
	25	?	—	0	—	0	0
	26	0	—	?	—	0	0
	27	0	—	0	—	0	0
	28	?	—	?	—	0	0
	29	++	++	0	—	0	0
	30	0	—	0	—	0	0
	31	++	+	++	0	0	0
	32	0	—	0	—	0	0
	33	+++	+	++	0	0	0
	34	++	++	?	—	0	0
	35	++	+++	+++	+	0	0
	36	0	—	0	—	0	0
	37	0	—	?	—	0	0
	38	++	+	0	—	0	0
	39	++	+	0	—	0	0
	40	?	—	0	—	0	0

H. S.

Ionesco-Mihaiesti (A.) & Ciuca (M.). **Sur la recherche de l'agglutinine anticholérique dans le sérum des individus vaccinés contre le choléra. Choix d'un antigène. (A propos de la communication de MM. Danila et Stroe).**—*C. R. Soc. Biol.* 1916. June 3. Vol. 79. No. 11. pp. 536–539.

A warning against the use of cholera emulsions killed by heat and the addition of phenol when testing for the presence of agglutinins

Dilution of anti-cholera serum agglutinating in normal saline at 8½ per 1000. 1 cc.	Nhatrang living vibrio. 0·1 cc.				Nhatrang vibrio killed at 60° (1½ hr.) + 0·6% phenol. 0·1 cc.				Mixture of 4 living vibrios. 0·1 cc.				The same mixture killed at 60° (1½ hr.) + 0·6% phenol. 0·1 cc.				Polyvalent anti-cholera vaccine prepared 75 days before in our laboratory. 0·1 cc.			
	Tubes observed macro- and micro-scopically, after																			
	5 m.	20 m.	2 hr.	15 hr.	5 m.	20m.	2 hr.	15hr.	5 m.	20 m.	2 hr.	15 hr.	5 m.	20m.	2 hr.	15hr.	5 m.	20m.	2hr.	15hr.
			deposit.	deposit.				suspension.			deposit.	deposit.				suspension.				suspension.
1. 1/10 1 cc.	+++	+++	++++	++++	0	0	?	++	++++	++++	++++	+++ +	0	0	?	++	0	0	0	++
2. 1/500 1 cc.	+++	+++	++++	++++	0	0	0	+	++++	++++	++++	+++ +	0	0	0	++	0	0	0	+
3. 1/1000 1 cc.	+++	+++	++++	++++	0	0	0	+	++++	++++	++++	++++	0	0	0	+	0	0	0	+
4. 1/1500 1 cc.	++	+++	+++	++++	0	0	0	+	++++	++++	++++	++++	0	0	0	+	0	0	0	+
5. 1/2000 1 cc.	+	++	+++	++++	0	0	0	+	+++	++++	++++	++++	0	0	0	+	0	0	0	±
6. 1/2500 1 cc.	0	+	+++	++++	0	0	0	+	+++	++++	++++	++++	0	0	0	+	0	0	0	0
7. 1/5000 1 cc.	0	0	+++	++++	0	0	0	±	++	+++	++++	++++	0	0	0	+	0	0	0	0
8. 1/10000 1 cc.	0	0	++	+++	0	0	0	0	++	+++	++++	++++	0	0	0	0	0	0	0	0
9. 1/15000 1 cc.	0	0	0	++	0	0	0	0	++	+++	+++	+++	0	0	0	0	0	0	0	0
10. 1/20000 1 cc.	0	0	0	+	0	0	0	0	+	++	+++	+++	0	0	0	0	0	0	0	0
1 cc. of normal saline only.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

in patients. As the table shows, living emulsions give much better results and can be depended upon to give a positive diagnosis though very little agglutinin be present.

H. S.

Porcelli-Titone (F.). **Sul valore immunizzante del tetravaccino Castellani: tifo + paratifo A + paratifo B + colera.** [The Immunising Value of Castellani's Tetravaccine.]—*Riforma Med.* 1916. Apr. 17. Vol. 32. No. 16. pp. 421–424.

By inoculating two rabbits with Castellani's tetravaccine and comparing them with two others inoculated, one with typhoid, the other with cholera vaccine, the number of organisms in question being equal in the two cases, the writer demonstrated, as far as demonstration is possible with such a small experiment, that agglutinins and bacteriolysins for typhoid and cholera respectively developed to almost equal extent whether the animal had received the tetra- or the mono-vaccine.

Absorption tests showed that though coagglutinins are formed when the tetravaccine is used, the major portion of the agglutinins present are specific.

H. S.

Tarassenitch (L.), Alexina (L.), Glotova (H.) & Fedorovitch (A.). **Vaccination mixte contre la fièvre typhoïde et le choléra.**—*C. R. Soc. Biol.* 1916. June 17. Vol. 79. No. 12. pp. 564–566.

The authors with experience in a very large number of inoculated soldiers found the local and general reaction no more severe after a mixed than after a simple vaccine. In 453 cases more closely examined, the following agglutinating titres were found after a mixed typhoid and cholera vaccine (250 million typhoid + 500 million cholera per dose) had been given.

Typhoid agglutination.

8 days after 1st inoculation: 26·9 % —; 42 % 1 : 200 +; 30 % 1 : 800 +
After the 2nd inoculation: 10 % —; 26 % 1 : 200 +; 63 % 1 : 800 +
After the 3rd inoculation all were positive at 1 : 800 or 1 : 1000.

The cholera agglutinations never went so high—after the third inoculation 48 per cent. 1 : 200 +.

Similarly the typhoid agglutinins remained demonstrable in the serum for a longer period.

H. S.

Combiescu (D.) & Balteanu (J.). **Recherches sur les vaccinations mixtes Typho-Paratypho-Cholérique chez l'homme.**—*C. R. Soc. Biol.* 1916. June 3. Vol. 79. No. 11. pp. 548–550.

The paper describes an investigation into the use of a variety of typhoid, paratyphoid and cholera vaccines, given mixed, singly and in varying quantities to different groups of men. Beyond saying that a multivaccine produces no greater reactions, either locally or generally, than a vaccine containing but one strain, the authors give no results, having apparently forgotten to include them.

H. S.

Parhon (C. J.) & Bazgan (Gr.). **Phénomènes anaphylactiques consécutifs aux revaccinations anticholériques. L'adrénaline dans le traitement de l'anaphylaxie.**—*C. R. Soc. Biol.* 1916. June 3. Vol. 79. No. 11. pp. 506–507.

After inoculating a number of soldiers with cholera for the third time the authors observed anaphylactic symptoms in three of them. In 1913 the men had had 2 and 4 cc. of vaccine with a week's interval, in 1914 the same; the third occasion was in 1915 when 4 cc. was given.

The first and most severe case is described as follows :—The symptoms set in 20 minutes after the inoculation with a sharp pain in the side and dyspnoea; although the inspirations were short and rapid, no auscultatory phenomena were observed. The face was very pale; there was great sweating; pulse, small and uneven, 120 per minute, after five minutes hardly perceptible. Extremities cold and cyanosed. Pupils dilated; loss of voice and power in limbs. Treatment consisted of warm drinks, hot bottles, injections of ether and caffeine. Because of its power of raising the blood pressure, adrenaline was thought of and 1 cc. of a 1 : 1000 solution given subcutaneously 15 minutes after the onset of the symptoms, the other remedies not having benefitted. The condition rapidly improved.

The other two cases were less marked, the symptoms beginning 30 and 45 minutes respectively after the inoculation. One cc. of adrenaline was given at once in these cases and without any other treatment the phenomena rapidly disappeared.

The authors could find no reason for just these three men developing the symptoms and suggest that there might have been some latent suprarenal insufficiency.

H. S.

Kutscher (Fr.) & Peters. **Der Nachweis eines Vibrio in ruhrverdächtigem Stuhl.** [The Discovery of a Vibrio in a Dysentery Suspect Stool.]—*München. Med. Woch.* 1916. Jan. 18. Vol. 63. No. 3. p. 76.

A soldier who was said to have had dysentery attacks in 1914 and the early part of 1915, presented the symptoms of the same disease later in 1915. His serum gave the following agglutinations :—

Serum dilutions	$\frac{1}{50}$	$\frac{1}{100}$	$\frac{1}{200}$
B. dys. Kruse	+++	+++	+++
,, ,, Flexner	+++	+++	+
,, ,, Y	+++	+++	++
,, typhosus	++	+	+
,, paratyphosus B	++	0	0

The man had been inoculated with typhoid and cholera vaccine.

In his stools however the only abnormal organism that could be isolated was a cholera-like vibrio.

H. S.

Castellani (Aldo). **Paracholera.**—*Brit. Med. Jl.* 1916. Mar. 25. pp. 448–449.

A plea for the use of the term paracholera in cases clinically similar to cholera, but from which only cholera-like vibrios can be isolated. The sugar and other reactions of three strains of *V. kegallensis* (or *paracholerae*) are compared with a series of true cholera strains and the independence of their serological reactions demonstrated in an agglutination table.

H. S.

HELMINTHIASIS.

NAKAGAWA (Koan). **The Mode of Infection in Pulmonary Distomiasis. Certain Fresh-water Crabs as Intermediate Hosts of *Paragonimus westermanii*.—*Jl. Infect. Dis.* 1916. Feb. Vol. 18. No. 2. pp. 131–142. With 2 maps and 4 plates.**

For the past ten years Nakagawa has been carrying out investigations regarding the life-cycle of *Paragonimus westermanii* in Formosa, and in this paper he gives an account of the results which he has obtained. A careful study of the distribution of the disease was made and in the course of that study he found that about 73 per cent. of the cases in Formosa were residents in the Shinchiku Prefecture. From these figures he deduced that that Prefecture was the centre of infection and his appointment to the Public Hospital at Shinchiku placed him in the most favourable position for carrying out his investigations. From the fresh-water molluscs, obtained from the streams and ponds in the region where pulmonary distomiasis exists as an endemic disease, he succeeded in obtaining seventeen different cercariae. As he was unable to distinguish which of these was the cercaria for which he sought, he reversed the procedure and placed various kinds of molluscs into water infected with the miracidia of the lung fluke. He states that the miracidia chiefly infested *Melania libertina* and *Melania obliquegranosa*, and from this result he assumes that these two species of fresh-water molluscs are *the first intermediate hosts* of the lung distomes. The cercaria is described as being 0·12 mm. long and 0·09 mm. broad with a tail 0·054 mm. in length.

" Attached to the oral sucker (0·036 × 0·032 mm.) are two pear-shaped bodies, the apices of which point towards the median plane of the body. The sucker has spines, each provided with a ring along its anterior edge. The ventral sucker is much smaller than the oral one, being 0·018 mm. in diameter. Within the parenchyma are three pairs of poison glands. The excretory vesicle is heart-shaped.'

Stimulated by KOBAYASHI'S work on *C. sinensis* [see below], he selected " a region of the Shinchiku Prefecture where patients are abundant " and commenced to collect molluscs, fishes, amphibians and insects with a view to the discovery of *the second intermediate host.* It was not until September, 1914, that a fresh-water crab, with numerous half-grown larval trematodes encysted in the liver, caused him to broaden his investigations so as to include these crustacea in his researches. Further investigation resulted in his finding fully-grown larval trematodes, possessing all the morphological structures peculiar to the lung fluke, in the gills of some of these crabs.

Apart from a conspicuous, large, black excretory vesicle, and comparatively large oral and ventral suckers, the structure of the younger forms, found encysted in the liver, is not well-marked. In the case of the fully-grown encysted forms, found in the gills, the relationship between larval and adult forms is apparent. The measurement of the fully-grown larva is given as 0·3–0·4 mm. in diameter. This is surrounded by a cyst wall 0·01 mm. thick—" a characteristic feature of the species." The larva has a short and thick body and lies straight —unlike others, which are contorted when lying in the cyst. The entire body is covered with short spines. The oral sucker is furnished

with a spine and is 0·08–0·11 mm. in diameter. The ventral sucker is slightly larger than the oral and measures 0·07–0·12 mm. in diameter. The oesophagus is short and leads into a bifurcated, thick, undulating intestine. The bifurcations run external and parallel to the long, thick excretory vesicle. The fresh-water crabs, in which the encysted larvae were found, are :—

1. *Potamon obtusipes* (Stimpson).
2. *Potamon dehaanii* (White).
3. *Eriocheir japonicus* (De Haan).

The author regards the first and second species as the *second intermediate hosts* of the lung fluke and, in view of the fact that the second species occurs outside Formosa, considers it probable that it functions as such in Japan proper.

The third species of crab was found infected with encysted larvae in only two out of 330 specimens, and the author is uncertain as to whether the attachment to these crabs is not to be regarded as accidental.

With reference to *P. obtusipes* the author states that it "is most abundant in the rivulets and creeks running through the mountainous regions of the Shinchiku Prefecture," and that in one locality "where 30–50 per cent. of the inhabitants are found to harbour the parasites in their lungs, 100 per cent. of these crabs carry the encysted larvae."

Feeding experiments on puppies, obtained from a district where pulmonary distomiasis is unknown, were carried out. In the first series two puppies were used and fed upon the "liver, gills and other organs" of infected crabs. One of these died sixty days after ingesting the infected material and was found to contain a number of cysts in the lungs; each cyst containing two or three immature flukes. The second puppy died ninety days after the experimental meal and in its lungs were found numerous cysts in which were adult distomes, with eggs ready to be discharged.

The experiment was repeated with three puppies at Shinchiku and in this case two were "fed with a large quantity of the internal organs of crabs, while the other was left untreated as control."

The two animals died fifty days after and were both found to be infected, whilst the "control" puppy was found to be free.

In order to work out the route taken by the larval trematode in its journey from the stomach to the lungs, a further series of puppies and kittens were fed upon infected crab-flesh and killed at varying periods of time. The course appears to be that, after having escaped from the cyst, the larva makes its way through the intestinal wall, near the jejunum, and reaches the abdominal cavity. It then crosses the abdominal cavity, perforates the diaphragm and reaches the thoracic cavity. Travelling beneath the pleura the larva reaches and pierces the parenchyma of the lung, and there the cysts are formed. The author also states :—"These parasites can bore through various

tissues and may reach other organs than the lungs, where they form their regular cysts, but the lungs seems to be the most favourable place for their development and the laying of their eggs. In other organs they can never reach the perfect growth."

This article is illustrated by two maps and four excellent plates.*

R. P. Cockin.

Sadao Yoshida. **On the Intermediate Hosts of the Lung Distome, *P. westermani* Kerbert.**—*Jl. Parasit.* 1916. Mar. Vol. 2. No. 3. pp. 111–118. With 1 plate.

Working in Japan, and apparently independently, upon the life-history of *Paragonimus westermanii* the author of this article has arrived at results which confirm those published by Nakagawa and noted above.

Yoshida finds that in Japan proper the crabs which function as *the second intermediate hosts* of the lung distome are :—

1. *Potamon dehaanii* (White),
2. *Sesarma dehaanii* (Milne Edwards),
3. *Eriocheir japonicus* (De Haan),

and states that these species can be found in any part of Japan. The first—*P. dehaanii*—is a very common crab in the shallow waters of the mountain streams and is edible. It is eaten both raw and cooked. The second—*S. dehaanii*—is usually found in the " lower parts " of various rivers and the author states that it is not used for food purposes. *Eriocheir japonicus* is a very common crab in the brooks and rivers throughout Japan and it is used as food.

With reference to the distribution of the larvae in the body of the intermediate hosts, the writer finds that the gills, muscles and liver are the sites usually occupied. The distribution varies but slightly according to the species of the host.

In the case of *P. dehaanii* and *P. obtusipes* the larvae are frequently found encysted in the liver and rarely in the gills and muscles, in *S. dehaanii* mainly in the liver and rarely in the gills and in *E. japonicus* chiefly in the gills, muscles and hypodermis and rarely in the liver.

" In the gills they adhere between the lamellae in the case of *P. dehaanii*, but are found only in the blood vessel running through the median line of the upper surface of the gill in the case of *E. japonicus*." In this latter species the larvae are found encysted " not only in the muscles of the trunk, but in the muscle and hypodermis of all the appendages."

Referring to the frequency of occurrence of the larvae in the intermediate host he quotes Ryo Ando as stating that 40–70 per cent. of *P. dehaanii* in the Gifu Prefecture are infected. In the Tokushima and

* It is hoped to obtain permission to reproduce some of these plates in a later number.

Okayama Prefecture the author finds that 70–85 of *E. japonicus* are infected and in the Osaka Prefecture *S. dehaanii* to the extent of "about 20–80 per cent."

The number of cysts in one crab varies considerably according to the species, and even in the same species it varies according to locality and other conditions. In one specimen of *E. japonicus* from Ikuina, in the Tokushima Prefecture, 343 cysts were collected and these were found to be distributed throughout the host-body as follows :—

Gills on both sides	81	cysts.
Body muscles on left side	99	„
Body muscles on right side	109	„
Forceps on right side..	19	„
Third leg on right side	12	„
Third leg on left side..	23	„

With regard to the morphology of the encysted larvae the author describes them as being almost spherical and measuring from 0·25–0·55 mm. in diameter. "The fully-grown cysts vary between 0·30–0·55 mm. in diameter." The cyst wall is described as being "a transparent chitinous membrane of tolerable thickness." In the fully developed larva the organs can be distinctly recognised and the author points out that the parenchymatous tissue of the body is tinged with "light red pigment." This latter characteristic makes the larvae easily recognisable, even when encysted in liver or muscle.

Feeding experiments were made upon young cats and dogs, which were brought from uninfected districts and carefully examined before being used for this work. Some of these experiments were incomplete when this paper was written. Four of the completed ones are described below :—

1. Young cat. Fed with 20 cysts on July 26th, 80 on the 28th and 130 on August 2nd. These cysts were all obtained from the gills of *E. japonicus* [Tokuskima Prefecture]. The cat died August 10th and in the abdominal cavity eighteen young worms, "floating in serous fluid and adhering to the omentum, mesentery and inner surface of the abdominal wall," were found. In the pleural cavity, sixteen worms "in the serous fluid and on the pleural membrane" were also found. These young distomes measured from 1–2 mm. and had not yet occupied the lungs.

2. Young cat. Fed with 80 cysts on August 7th and killed on August 17th. Cysts obtained from gills of *E. japonicus* [Tokushima Prefecture]. Five worms found in the abdominal cavity and six in the pleural. These measured 1 mm. in length and 0·5 mm. in breadth.

3. Young dog. Fed with 33 cysts on August 14th, 46 on the 17th, 90 on the 28th, 50 on the 30th and 32 on September 1st. The cysts of the first two feeds were obtained from the gills of *E. japonicus* [Tokushima Prefecture] and the remaining cysts from *S. dehaanii* [Osaka Prefecture]. The dog died September 29th and at the subsequent examination, numerous perforations on the inner surface of the abdominal body wall and on the surface of the diaphragm were observed. In the abdominal cavity thirty, and in the pleural cavity forty-three young worms were found. In the latter situation they were noted "in the serous fluid and on the surfaces of various organs; lungs, heart, and pleural membrane." Yoshida states that, in this case, he found a good specimen which demonstrates "that the worm in the pleural cavity enters the lungs from its surface by perforating." In fixed specimens, the measurements of the worms in this case are given as varying from 1·5–5 mm. in length and 0·5–2 mm. in breadth. Numerous worms, in various stages of development, were observed in the lungs.

4. Young cat. Fed with four cysts on June 15th, one on 16th, and three on 17th; killed August 17th. All the cysts used were taken from the liver of *S. dehaanii*. At the post-mortem examination two young distomes were found. One of these was in the pleural cavity, the other in the right lung. The measurements of these worms are given as 4 mm. long and 2 mm. broad. The latter specimen was immature.

The account given by Yoshida of the route taken by the larva, in its journey from the stomach to the lung in the definitive host, agrees with that which is noted in Nakagawa's paper. He, however, adds that, in addition to the usual course, the young distomes "may penetrate the abdominal wall and move about in the muscular layers of the connective tissue."

Some worms, in the pleural cavity, may even travel headwards in the loose connective tissue around the oesophagus and great vessels.

The author considers that this discovery of the wandering character of the young fluke affords an explanation of cerebral and spinal paragonimiasis which was not supplied by former theories.

A plate illustrates the article.

R. P. C.

Kobayashi (H.). **On the Life-History and Morphology of *Clonorchis sinensis*.—*Cent. f. Bakt.* 1. Abt. Orig. 1915. Jan. 13. Vol. 75. No. 4. pp. 299–318. With 4 plates.**

In this article the author amplifies the preliminary report on this subject which was noted in a previous issue of this *Bulletin* [Vol. 1, pp. 429–430]. He states that whilst employed in the study of the developmental stages of trematodes in fresh-water molluscs, fishes and other aquatic fauna, he found that one species of young distome, encysted in the muscular tissue of certain of the fresh-water fish, coincided exactly in its distribution with that of human liver distomiasis. The distome, moreover, bore a striking resemblance to the liver distome met with in Japan.

He finds that these encysted distomes are found in the following species of fish :—

1. *Pseudorasbora parva.*
2. *Leucogobio guntheri.*
3. *Leucogobio* Jordan & Snyder.
4. *Sarcocheilichthys variegatus.*
5. *Pseudoperilampus typus.*
6. *Paracheilognathus rhombeum.*
7. *Acheilognathus lanceolatum.*
8. *Acheilognathus limbatum.*
9. *Acheilognathus cyanostigma*
10. *Abbottina psegma.*
11. *Biwia zezera.*
12. *Carassius auratus.*

The distribution of the cysts in the above hosts appears to be restricted to the subcutaneous tissues and muscles, and they are usually found to be more numerous in the superficial than in the deeper tissues. The myocommata have, apparently, no influence upon the distribution of the cysts in the muscle. The cysts are 0·135–0·145 mm. in length by 0·09–0·1 mm. in breadth. The cyst wall is thin, hyaline and structureless and, when *in situ*, is surrounded by a layer of cells, the product of the activity of the host. The structure of the encysted distome varies slightly according to its age. In the early forms eye-spots are seen, but these disappear as growth proceeds. The measurements of a fully-developed, fresh specimen are given as 0·4–0·5 mm. in length by 0·08–0·09 mm. in breadth. The cuticle is armed with fine

spines and the encysted distome is bent upon itself in the long axis of the cyst. The size of the suckers, consequently, depends upon the degree of contraction which obtains.

In the cyst the larval distome may occasionally be seen to make movements of a rotatory character but, when taken out of the cyst, it creeps about in a leech-like fashion; slowly at room temperature and more actively when the temperature is raised. The author notes that these cysts can be found in the fish throughout the year, but that the younger ones are more abundantly met with from August to October.

In experimenting with a view to gauging the tenacity of life possessed by the larval distomes, the following results were obtained :—

1. The larvae are killed by heat at 100° C. and approx.
2. Subjection to temperatures of 50°–70° C. for fifteen minutes is insufficient to kill them.
3. Exposure to vinegar and Soya sauce for five hours will not kill them.
4. The larvae will live for several days, at least, when the fish in which they are encysted is kept in a refrigerator.
5. At room temperatures, the larvae die as their host putrefies.

In another series of experiments the author fed thirty cats, one dog, twenty rabbits, forty guinea-pigs and fifty rats with fish containing encysted larvae. In seven days typical *Clonorchis sinensis* were found in all the subjects of the experiment. The development of the young distome and the route followed by the parasite in the final host were ascertained by feeding experiments upon cats which, as in the case of the cats and dog in the above series, were repeatedly examined for ova in the faeces before being utilised for this work.

These cats were killed at varying intervals of time and dissected, and from this series of experiments the following observations were made.

Three hours after the infected fish had been ingested some of the cysts were found to be empty and the liberated distomes were actively creeping about amongst the food-mass with the aid of both suckers. As early as fifteen hours afterwards, free distomes were found both in the gall-bladder and bile duct. The rate of growth is dependent upon the nourishment obtainable, the number of parasites present and the size of the host. If numerous in a small animal they grow more slowly than when few parasites are present in a larger animal. Within twenty-six days after infection the parasites attain maturity and eggs are found in the faeces of the host.

The posterior portion of the body of the distome grows more rapidly than does the anterior, and this the author considers is due to the more rapid development of the genitalia at this stage.

Of the suckers, the oral grows the more rapidly and ultimately becomes the larger, so reversing the condition which obtains during the larval state. The author notes that, for the greater part of the period of growth, the cuticle is furnished with flattened needle-like spines; and that, up to a certain period, increase of spines corresponds with increase of growth. Owing to the less rapid growth of the anterior portion of the body the spines are relatively more numerous in that situation. The oldest specimen which was found to possess spines was removed from a cat which had been fed on infected fish twenty-three days previously.

The usual sites occupied by this fluke in the definitive host are the hepatic ducts, the gall bladder and the bile duct. When the parasites are numerous the greater number of them are found in the fine hepatic ducts, very few being present in the gall bladder. Rarely, specimens occur in the pancreas and duodenum. The hosts of the liver distome hitherto described are man, the dog, the cat, and the pig. The author succeeded in rearing this parasite from larva to adult in the rabbit, the guinea-pig and the rat.

Regarding *the first intermediate host*, the author is of opinion that the cercarial stage of the life-cycle of this fluke is passed in one of several species of *Melania*, most probably *Melania libertina*. The fact that Melania infested with cercariae, which bear a close structural resemblance to the young encysted larvae of *Clonorchis*, are very abundant in the rivers and swamps of those regions where liver distomiasis prevails, supports this view.

A more detailed description of this latter subject is promised upon the completion of experiments which were in progress when this article was written.

An excellent description of the structure of the adult worms is given and the author calls attention to the following facts which have come under his observation :—

1. The first eggs produced by the sexually mature worm are imperfect.
2. The pigmentation (yellow or brownish) of the adult is probably degenerated shell material derived from the yolk cells.
3. Senile degeneration is found in the larger specimens (11–15 mm.). In these senile forms the yolk glands partly or completely disappear, the uterus is empty and the body is pigmented.

He is unable to state what is the period of life of these distomes but the results of his experiments show that some live for at least two years in the final host.

In concluding his article he advances the following reasons why *Clonorchis endemicus* should not be regarded as a species separate from *Clonorchis sinensis* :—

1. The sizes of *C. sinensis* and *C. endemicus* (13–19 mm. and 10–13 mm. respectively) depend upon the size of the host and upon the number of parasites present in the host.
2. Regarding the vitellaria which are described by Looss as being discontinuous (interrupted by several undeveloped portions) in *C. sinensis* and continuous in *C. endemicus*, the author adduces the following descriptions of six specimens in order to demonstrate the inconstancy of this characteristic :-

No.	Host.	Length.	Breadth.	Vitellaria.	Pigment.
1	Cat	18·0 mm.	3·5 mm.	Continuous	No
2	Man	11·0 mm.	2·7 mm.	Continuous	Abundant
3	Man	9·5 mm.	3·0 mm.	One interruption on one side	Abundant
4	Man	11·5 mm.	2·5 mm.	Two interruptions on both sides	No
5	Cat	14·0 mm.	2·5 mm.	One interruption on one side	No
6	Cat	7·5 mm.	2·0 mm.	Several interruptions on both sides	Abundant

3. The common occurrence of yellowish or blackish pigment in the parenchyma of *C. sinensis* and its absence in *C. endemicus* may, in the author's opinion, be due to age and partly to senile changes. The larger worms being usually the older.

4. Regarding Looss's contention that in *C. sinensis* the egg narrows more distinctly anteriorly and has a higher lid with a more projecting rim than that of *C. endemicus*, the author states that he has noticed that the exact reverse is the case. In an egg from a specimen (10 mm.) taken from a cat the shell tapered considerably anteriorly and was provided with a distinctly vaulted lid, whilst in one taken from a specimen (14 mm.) the shell tapered considerably less and was furnished with a relatively flat lid. He has noted these differences so frequently that he cannot consider them to be exceptional.

R. P. C.

Fischer (Walther). **Ueber die Eier von** *Clonorchis sinensis.* [The Egg of *Clonorchis sinensis.*]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1915. July. Vol. 19. No. 13. pp. 358–361.

The Chinese population of Shanghai is stated by the author to be infected with *C. sinensis* to the extent of six per cent. This figure was obtained as the result of the examination of 128 cases.

With reference to the eggs of *C. sinensis*, Fischer gives the average length as 29·6μ and the average breadth as 15·4μ. Considerable variations were noted in the length of individual specimens. The smallest specimen examined had a length of 22·6μ and the largest of 33·8μ.

The measurements recorded by other observers may be summarised thus :—

Observers.	Length.	Breadth.
Braun	29 microns	16 microns
Jeffery and Maxwell ..	27 ,,	15 ,,
Looss	24–25 ,,	15 ,,

Fischer points out that the breadth of the egg is approximately the same in all the recorded figures.

R. P. C.

Cawston (F. G.). i. **Schistosomiasis in Natal.**—*S. African Med. Rec.* 1916. Feb. 26. Vol. 14. No. 4. pp. 53–54.

ii. **Bilharziosis in South Africa.** *Ibid.* Apr. 8. No. 7. pp. 99–105.

The former of the above articles gives an account of the author's work on the life-cycle of *S. haematobium* which was carried out in Natal and which has already been noted in this *Bulletin* [Vol. 7, pp. 348–349].

In the second article, a general account of all the recent work on this subject is detailed and much interesting information regarding the disease as it manifests itself in South Africa is recorded.

With regard to the South African type of bilharziasis the author states that " it is most exceptional to hear of cases which could be said to have died or to have had their lives shortened by bilharziasis in

South Africa." He also adds that " one can with impunity recommend an insurance company to accept for life insurance at the usual rates an otherwise suitable applicant who has a previous history of bilharziasis " provided that blood and mucus have been absent from the urine for twelve months and the ova for six months.

Whilst Cawston considers that the South African type of bilharziasis is " by no means the serious disease which is reported from Egypt," he admits that one occasionally does meet with serious symptoms in the cases there, " which may be attributed indirectly to bilharziosis." The occurrence of gravel and stone, he states, amongst patients giving a history of this disease, is more common than in the case of those uninfected with bilharzia, and " there is evidence to prove that, in some instances, the ova do form nuclei for gravel or stone in the kidney substance."

" Very severe haemorrhage from the bladder " and " marked anaemia " are also noted as occurrences in some cases. With reference to treatment, Cawston recommends the use of hexamine, and he states that he has been struck with the marked improvement which is noticeable in cases after the administration of hexamine and buchu.

In those cases where the urine is alkaline, he suggests that " an occasional dose " of sodium acetate should be administered alternately with the hexamine. Sodium acetate and hexamine " should not be combined in the same dose."

R. P. C.

Cawston (F. G.). i. **The Cause and Effect of Bilharzia Disease in South Africa, Egypt, and the Far East.**—*S. African Med. Rec.* 1916. June 10. Vol. 14. No. 11. pp. 163–164.
ii. **The Prevention of Bilharzia Infection.** [Correspondence.]—*Lancet.* 1916. July 15. p. 121.

i. In this note Cawston states that he has found the Bilharzia cercaria in 13 out of 92 specimens of *Physopsis africana*, collected from the Toll Gate brickfields at Durban, and in 4 out of 367 specimens of the same mollusc obtained from the Umsinduzi River.

Of 19 specimens of *P. africana* exposed to infection with miracidia, from the urine of a bilharziasis patient, seven " contained cercariae with bifid tails " when examined. " Similar experiments with *Limnaea* and *Planorbis* have proved entirely negative."

ii. Writing on May 13th 1916, Cawston states that " at this period of the year " 19 per cent. of the fresh-water molluscs of Natal are infected with cercariae. This figure is arrived at as the result of the examination of 596 molluscs, of which 116 were found to be infected. Of the infected snails, 76 harboured " tadpole " cercariae, and 40 cercariae with bifid tails. The bifid-tailed cercariae were of five varieties. " The cercariae which answer to the description of those which cause bilharzia in man and beast in Egypt and the Far East are the more common of the forms with bifid tails met with in Natal." Of the *Physopsis* collected at Durban, 14 per cent. were infected with these latter cercariae; and, of those from the Umsinduzi River, 15 per cent.

R. P. C.

Cawston (F. G.). i. **The Prevention of Bilharzia Infection.** [Correspondence].—*Lancet.* 1916. Apr. 15. p. 837.
ii. **The Causes of Bilharziosis.**—*Med. Jl. S. Africa.* 1916. Feb. Vol. 11. No. 7. pp. 125–126.

In both the above notes Cawston advances the opinion that the time has arrived when measures, with a view to preventing the spread of bilharziasis, should be instituted. He points out that a great amount of information, regarding the life-cycle of the Schistosome worms producing this disease, is now available, and suggests that the application of this knowledge promises success for the preventive measures undertaken.

He considers that the measures should be directed mainly to two ends :—

1. The prevention of the contamination of bathing pools and drinking water by infected urine.
2. The removal of the intermediate hosts [certain molluscs] from places where they are exposed to infection.

He notes the significant distribution of a dark sinistral snail, *Physopsis africana*, in Natal and its presence in bathing pools which are known " to be associated with Bilharzia infection " [see also this *Bulletin*, Vol. 7, p. 348].

R. P. C.

Becker (J. G.). **A Preliminary Note on an Intermediate Host of *Bilharzia haematobium* in the Transvaal, together with a Description of the Cercariae with which the Mollusc is infected.**—*Med. Jl. of S. Africa.* 1916. Apr. Vol. 11. No. 9. p. 156. With 1 plate.

Acting on the advice of Dr. Watkins-Pitchford, the writer collected fresh-water snails from the bathing-pool at Nijlstroom, Transvaal, which was known to be a source of infection to the children who bathed there.

Thirty-six specimens were collected and Dr. E. Warren, of the Natal Government Museum, identified thirteen of these as *Physopsis africana* and twenty-three as being a species of *Limnaea*—possibly *L. natalensis*. Three of the molluscs of the former species were found to be heavily infected, whilst in the latter " not a single infected individual was discovered."

The cercariae obtained from the infected specimens possess a bifurcated tail and are described as measuring " approximately 0·5 mm. (body 0·185, tail 0·225, prong 0·09)." The writer was unable to detect either a pharynx or eye-spots.

He confirms Leiper's observation that the cercariae do not live longer than about two days in water, and adds that " the great majority shed their tails before dying."

R. P. C.

Minet (H.). **Deux cas de Bilharziose vésicale provenant de l'Afrique Septentrionale française.**—*Ann. des Maladies Vén.* 1915. July. Vol. 10. No. 7. pp. 385–396. With 1 coloured plate.

In this article the writer deals with the pathological lesions in vesical bilharziasis, as observed by means of the cystoscope. The observations were made on two soldiers who were suffering from the

disease; one of these coming from Sousse (Tunis), the other from Merrakech (Morocco). The latter had, however, lived for the past eight years at Oran in Algeria, and it is doubtful whether the disease was contracted in Morocco or at Oran.

Both patients exhibited one symptom of the disease—haematuria; and neither complained of pain or frequency of micturition. The soldier from Tunis was recognised as being an early case, whilst the patient from Oran was noted as a more advanced stage of the disease.

Upon cystoscopic examination the only pathological feature observed, in the bladder of the former case, was slight vascularisation of the mucosa. In the latter case pathological lesions of three types were noted, which may be summarised as follows:—

(a) *Small yellow granulations*: These are described by the author as "absolutely characteristic of vesical bilharziasis." In appearance they are likened to *grains of millet* and consist of small prominences of normal mucosa surmounted by a yellow cap.

The granulations which occur in tuberculosis of the bladder are pale yellow, hemispherical vesicles which lie on a flat background of inflamed mucosa, and may be distinguished by these features.

(b) *Infiltrated swellings of the mucosa*: In the early stages these are described as having the appearance of folds of normal mucosa. The surface of these rugae is not infrequently studded with the small yellow granulations described above. Later, vascularisation of the mucosa covering these folds takes place and intense congestion can, subsequently, be observed. The author calls attention to the fact that the vascularisation and subsequent congestion are restricted to the infiltrated areas. In those cases in which cystitis is superadded, this restriction would not be seen.

(c) *Fungating vegetations of the mucosa*: These resemble the exuberant granulations which are occasionally seen in wounds. They form sessile tumours as large as the rugae just described, and of which they are the ultimate stage. It was possible in some instances, by following a fold along its course, to observe the gradual transition from infiltrated and congested mucosa to the fungating stage.

A coloured plate, which illustrates the points noted by the author, is attached to this article and should be referred to by those doing cystoscopic work in countries where bilharziasis is met with.

R. P. C.

Burres (W. T.). **Intestinal Bilharziosis in Western Panama.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1916. May. Vol. 3. No. 11. pp. 611–612.

Although cases of intestinal bilharziasis are of comparatively rare occurrence in the Canal Zone, the writer considers it likely that the introduction of these occasional cases will eventually result in the permanent establishment of the disease in the country.

He states that the records of the U.S. Government Hospital at Ancon show that fifty-eight cases of the disease have been observed in the Canal Zone from 1905–1913 inclusive; and, so far as he was able to learn, all of these, with one exception, were West Indian negroes. The one exception was a white Spanish woman, who was not a native of Panama.

The writer states that, in the Province of Chiriqui (250 miles west of Panama City), he found the eggs of *S. mansoni* in the stool of a negress from St. Lucia. He explained the nature of the case to the authorities and obtained their promise " to either isolate or deport the woman."

R. P. C.

Risquez (Jesús Rafael). **Nota preliminar sobre la Anatomia patológica de la Bilharziosis en Venezuela.** [Preliminary Notes on the Pathological Anatomy of Bilharziasis in Venezuela.]—*Gaceta Med. de Caracas.* 1916. Feb. 29. Vol. 23. No. 4. pp. 25–26.

In a series of eighty-six post mortem examinations, made at the Hospital Vargas, Caracas, the author found nineteen of these to be infected with bilharziasis. The notes on these latter cases are summarised as follows :—

1. The proportion of cases infected with *Schistosoma mansoni* was about 22 per cent. of the whole series, and of these the majority were females.
2. The greater number of the cases were between the ages of 20–40 years, and the majority were born in Caracas.
3. The whites were infected three times as frequently as the half-castes. [Indians and Negroes were not represented in the statistics.]
4. The following lesions were found associated with bilharziasis :—

(a) Pulmonary and pleural lesions on five occasions.				
(b) Hepatic	,,	,,	,,	,,
(c) Cardiac	,,	,,	two	,,
(d) Gastric	,,	,,	,,	,,
(e) Renal	,,	,,	,,	,,
(f) Syphilitic	,,	,,	,,	,,
(g) Intestinal (enteritis)	,,	,,	one	,,

5. The pleura was adherent on the right side as a rule, and the majority of the cases showed cirrhosis of the liver.
6. The size of the liver appears to be proportional to that of the spleen, except in those cases in which other aetiological factors have previously affected these organs.
7. In no case were the classical lesions, described as occurring in this disease, met with; and papillomatous tumours in the bowel were not observed.
8. The transverse and descending colon were usually found to be diminished in calibre and the mucosa was, more or less, extensively spotted with small, circumscribed punctiform haemorrhages. Ulcers of medium depth and haemorrhoidal masses were also present. In some cases these latter were also ulcerated.
9. The presence of hypertrophied glands in the gastro-hepatic omentum was relatively constant. At times these were also noted at the roots of the lungs.
10. Adhesions of that portion of the peritoneum which envelops the great intestine were frequently noted. This was always the case when the calibre of the gut was diminished.

R. P. C.

Post (D. C.). **Salvarsan in the Treatment of Schistosomiasis. Report of a Case.**—*U.S. Naval Med. Bull.* 1915. Oct. Vol. 9. No. 4. pp. 645–650.

Post, in the above paper, gives the clinical history of a case of Asiatic schistosomiasis, occurring in one of the members of the hospital staff of the U.S.S. "Palos."

The case was for a considerable time under treatment before the ova of *Schistosoma japonicum* were found in the faeces, and during that period the diagnosis was in doubt.

Eosinophilia was present, throughout the course of the disease, to the extent of 10–12 per cent. of the total leucocyte count.

The case was treated by the intravenous injection of 0·6 gm. salvarsan and within a month the patient had nearly recovered his normal condition. Further examinations of the faeces for ova were negative.

The author gives the following advice to those searching for the eggs of *S. japonicum*.

A rather hard stool should be taken and it should be examined in the state in which it was passed, without admixture of urine, water or disinfectants. A search should be made on the top and in the cracks of the stool for the little threads of mucus, frequently blood-stained, which contain the eggs.

[The U.S.S. "Palos" patrols the Yang-tse River and so traverses a region throughout which Asiatic schistosomiasis is endemic.]

R. P. C.

Schrecker. **Ueber Salvarsanbehandlung bei Bilharziosis.** [The Treatment of Bilharziasis with Salvarsan.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1915. Mar. Vol. 19. No. 5. pp. 149–150.

The author of this note is not convinced that intravenous injections of salvarsan in the treatment of bilharziasis are of any service.

He records eight cases—four long-standing and four recent—which he had treated by this method, and in only two of these did Bilharzia ova even temporarily disappear from the urine. In the remaining six cases no change was noted, eggs and blood being constantly present. In the two cases, in which temporary disappearance of eggs was noted, blood continued to be present throughout the whole period of observation.

R. P. C.

Robertson (Wm.). **Thymo-Benzene in Bilharziosis.** [Correspondence.] *Lancet.* 1916. Mar. 25. p. 698.

Writing from Cape Province, South Africa, Robertson calls attention to the excellent results obtained, by the use of thymo-benzene, in the treatment of bilharziasis. The dose he recommends is thymol, 2 grains dissolved in half a drachm of benzene, and he states that in such doses the ova are passed in great numbers, "the majority being black." This change in the appearance of the ova he regards as a degenerative one.

Continuation of this treatment causes abatement of all subjective and objective symptoms, and in a few weeks, in mild cases, no ova can be found in the urine on repeated examination.

In graver cases such good results are not obtained, although, even in these, there is marked improvement in the general condition in spite of persistence of the ova in the urine.

The author states that he knows of no other mode of treatment which yields such good results in this disease; and, he adds that, in such doses as that referred to above, no discomfort to the patient is experienced.

[Ekins obtained most unsatisfactory results in the treatment of four cases of bilharziasis, at Alexandria, from the use of this drug (see this *Bulletin*, Vol. 6, p. 300). Ekins's doses were, however, considerably larger than those recommended by Robertson.]

R. P. C.

Singer (J. J.). **A Case of *Bothriocephalus latus* Infection.**—*Jl. Amer. Med. Assoc.* 1916. May 20. Vol. 66. No. 21. pp. 1618–1619.

Singer reports, in this note, the occurrence of a case of *Bothriocephalus latus* infection in a female patient at St. Louis, U.S.A. The patient was a native of Vilna, Russia, and had been passing segments of tapeworm at intervals for the past four years. Sixteen years previously she passed a tapeworm, fifteen feet in length, after the administration of an anthelmintic. A sister and her mother had both been the subjects of tapeworm infection.

The treatment adopted in the present instance consisted of the administration of 10 gr. capsules of male fern at intervals of half an hour for six doses. Two ounces of castor oil were given on the night before the administration of the male fern, and a further two ounces four hours after the last capsule had been taken.

The worm recovered measured twenty-seven feet and included the head.

Singer notes that Bothriocephalus infection is comparatively rare in the United States, only thirty cases having been reported up to date. In only one of these was the patient American born, a boy of Finnish parentage. The author quotes Nichorson as stating that he has frequently found the larvae of *B. latus* in fish caught in the Great Lakes, and that the method of preparing fish for food in the United States accounts for its relative rarity there.

R. P. C.

Stewart (F. H.). ***Hymenolepis nana* (Siebold) (The Dwarf Tapeworm) as a Parasite of Indian Soldiers.**—*Indian Med. Gaz.* 1916. June. Vol. 51. No. 6. pp. 218–219. With 2 figs.

In this note the writer records that he found the ova of *H. nana* present in the faeces of eight sepoys of the Indian garrison at Hong Kong, out of a series of 320 men from whom specimens were examined.

Of the eight men, two were Punjabi Mahomedans and six were Dogras. No symptoms which could be attributed to the presence of the parasite were noted in any of the cases. In one of the men perityphlitis coexisted with the cestode infection, but Stewart appears to be

inclined to regard the association as accidental. The eggs were recovered by filtration through muslin and sedimentation of the filtrate. The measurement of the outer shell of the egg is given as 0·07 mm. in diameter. Stewart considers that the accounts of the anatomy of this parasite which have hitherto been published are inaccurate and he promises " a full account of this interesting subject based upon a large supply of material " in the near future.

Fig. 1.

Egg of *H. nana* × 650.

Fig. 2.

Strobila, natural size.

In treating the cases, the author found Oleum chenopodii more effective than Filix mas [doses not stated]; " heads " being more frequently recovered after the administration of the former drug.

R. P. C.

Ward (J. La Bruce). **Diagnosis in Hookworm Diseases.**—*Southern Med. Jl.* 1915. Sept. 1. Vol. 8. No. 9. pp. 745–750.

The writer of this paper is of opinion that microscopical examination of the faeces is essential for the diagnosis of hookworm infection. He considers that " there is no other disease which is so insidious or which has symptoms so numerous and so protean."

Bass is cited as stating that " the combination of characteristic anaemia, associated with under-development, weakness, dilated heart and a history of ground-itch is not likely to be confounded with anything else." This statement the author considers correct, but points out that such a combination of symptoms is only met with in extreme cases, " and these are by no means in the majority."

The author's conclusions are :—

1. That hookworm disease is one of the most prevalent and the most important diseases with which the physicians of the Southern States have to deal .
2. That a reliable diagnosis cannot be made without a microscopical examination of the faeces.
3. That an examination of the faeces should be included in the routine of every hospital.
4. That the physicians of the Southern States should suspect the presence of hookworm infection " regardless of symptoms or their absence."

R. P. C.

MacDowell (Affonso). **Da ictericia na ankylostomiase e da sua pathogenia.**—*Arch. Brasileiros de Med.* 1915. Apr.–Mar. Vol. 5. Nos. 4–5. pp. 189–197.

After discussing the rarity of jaundice in ankylostomiasis and calling attention to the scant notice which this subject has received in the literature, the author summarises his conclusions regarding it as follows :—

1. Jaundice is a rare occurrence in the course of ankylostomiasis, in spite of the great amount of blood destruction which takes place.
2. The spleen and liver are only exceptionally enlarged in this disease.
3. The lack of haemolytic power possessed by the spleen in this parasitosis explains the clinical rarity of the icteric form.
4. When a haemolytic jaundice is met with in ankylostomiasis it is always accompanied by hyperplasia, and consequent enlargement of both the spleen and liver.

R. P. C.

i. Fechtig (A. J.) & Walker (J. E.). **Hookworm History Schedules of Two Patients treated with Thymol.**—*Texas State Jl. Med.* 1916. Mar. Vol. 11. No. 11. pp. 602–603.

ii. Grave (Floyd) & Slater (H. M.). **Hookworm History Schedules of Two Male Patients treated with Thymol at the U.S. Marine Hospital, Wilmington, N.C.**—*New Orleans Med. & Surg. Jl.* 1916. Apr. Vol. 68. No. 10. pp. 629–638.

In a note attached to both the above articles, Professor C. W. Stiles states that the chief object in their publication is to demonstrate the schedule method for taking the clinical histories of patients with parasitic infections, which has been in use for several years at the U.S. Marine Hospital, Wilmington, North Carolina. Professor Stiles adds :—

"There is nothing new in principle in the plan, but so far as can be judged from the literature on hookworm disease, its application and details represent several departures from usual procedures.

"The schedules have the advantage of greater uniformity and completeness, so that in a large series of cases the separate symptoms can be more easily compared than is usually the result in clinical histories taken by different observers."

R. P. C.

Heiser (Victor G.). **Are there Harmful and Harmless Hookworm Infections?**—*Jl. Sociolog. Med.* 1916. Feb. Vol. 17, No. 1. Whole No. 151. pp. 37–40.

In this paper the writer suggests the possibility of there being two varieties of hookworm infection—the one harmful, the other harmless. In support of his contention he instances the cases of Bilibid Prison and the towns of Tay Tay, Las Pinas and Tuguegarao, all of which are in the Philippines.

In the first of these 3,000 prisoners are confined ; and, previous to treatment for the expulsion of hookworms being undertaken, the death-rate amongst them was 80 per thousand per annum. Subsequent to treatment, the death-rate fell to 12 per thousand per annum.

The same treatment, when applied to the populations of the towns named above, failed to produce any alteration in the death-rate—[25,000 cases treated]. [The conditions under which the two groups lived, subsequent to treatment and during treatment, in addition to the small possibility of reinfection which existed for prisoners living under the ideal hygienic surroundings which the writer cites, would appear to explain to some extent the results obtained. The death-rate, before and after treatment, of the civilian populations is not given.]

R. P. C.

GUNN (Herbert). **The Control of Hookworm Disease by the Pacific Mail Steamship Company.**—*Jl. Sociolog. Med.* 1916. Feb. Vol. 17. No. 1. Whole No. 151. pp. 16–26.

In 1912, the United States authorities issued an order requiring a medical certificate showing that aliens, coming from hookworm infected districts, were free from that parasite upon disembarkation in the United States. A fine of one hundred dollars was imposed, by the authorities, upon any steamship company which failed to comply with this regulation. Consequently, the Pacific Mail Steamship Company decided to employ a representative in Hong Kong to examine cases before embarkation. Those cases which were found to be infected were treated by the ship's surgeon during the voyage.

The writer states that this method has worked out quite satisfactorily, and that only about three per cent. of the cases treated are found to be infected upon their arrival at San Francisco.

The procedure adopted, in the case of adults in good condition, is to give thymol (grs. 80) on two successive days followed by one day's rest. This is repeated, until the daily examination of the stools shows that ova are no longer present. As soon as the microscopical examination of the stool is negative, the treatment is discontinued. The writer states that the average length of time required for a "cure" is about seven days. In the majority of cases this form of treatment was efficacious, but in intractable cases heroic measures were adopted. The following is a case in point:—

"Leaving Hong Kong June 26th and arriving in San Francisco July 25th:—

June 27	.. ..	Thymol, grs. 80.
June 28	.. ..	Rest.
June 29, 30 and July 1	..	Thymol, grs. 80 daily.
July 2 and 3	.. ..	Rest.
July 4 and 5	.. ..	Thymol, grs. 80 daily.

On account of bad weather after Yokohama, no treatment until:—

July 10–12	.. ..	Thymol, grs. 90 daily.
July 13	.. ..	Rest.
July 14–17	.. ..	Thymol, grs. 100 daily.
July 18	.. ..	Rest.
July 19–22	.. ..	Thymol, grs. 120 daily."

Thus 1,560 grains of thymol were given in sixteen days, and it was not until the morning of the last treatment that a negative examination for ova was made. Gunn states that he has "used large doses of thymol, often repeated for several days in succession" for some years

past, and has never seen any serious results from its use. He adds " loss of weight from the repeated purging is the only ill-effect that the majority of patients show after a strenuous course of treatment."

Among the 1,776 cases treated by the company there was only one death.

R. P. C.

WHYTE (G. Duncan). **Ankylostomiasis: Simplified Diagnosis and Treatment.**—*Ann. Trop. Med. & Parasit.* 1916. Apr. 29. Vol. 10. No. 1. pp. 79–84.

The difficulty of determining whether further anthelmintic treatment is necessary, after one course of treatment for the expulsion of hookworms has been concluded, has prompted the author to place on record the following simple method with a view to its solution.

The test is dependent upon two facts :—" (i) A trace of blood is constantly present in the faeces of ankylostomiasis patients, and (ii) there is a test for blood so sensitive as to reveal its presence in a dilution of 1 in 800,000."

The method of carrying out the test is as follows :—

" To 2 cc. of a watery solution of faeces is added 1 cc. of the alkaline solution of phenolphthalin (i.e. reduced, and therefore colourless, phenolphthalein) and then one drop of hydrogen peroxide. In the presence of blood some of the phenolphthalin is re-oxidised to phenolphthalein and a bright red colour appears."

It is, however, necessary before applying the test to exclude the presence of peptic ulcers, haemorrhoids and other gross lesions causing bleeding into the gastro-intestinal tract. In addition, the patient should not have eaten meat or blood for three days previously. [Cockles, " a favourite condiment in Swatow," will also give the blood reaction if eaten in sufficient quantity.] The author states that " the sensitiveness of the test is shown by the fact that often less than twenty worms were expelled in the last treatment the patient received, i.e., so small a number of ankylostomes were able to give rise to an amount of blood sufficient to be detected by this test."

The method of treatment, adopted by Dr. Whyte, is summarised as follows :—

On the night previous to the administration of the anthelmintic, the patient is given a light meal at 5 o'clock and two hours later a powder containing calomel (grs. iii), phenolphthalein (grs. ii) and santonin (grs. iv). The following morning, no food is given and the treatment is continued thus :—

At 6.0 a.m.	—beta-naphthol	grs. 40.
,, 8.0 a.m.	—beta-naphthol	grs. 40.
,, 10.0 a.m.	—thymol	grs. 30.
,, 12.0 noon	—Mist. Mag. Sulph. ..	oz. 1.

The saline aperient is repeated at 3.0 p.m. if the bowels have not acted by that time.

If the patient chooses to return home that evening, he is permitted to do so. He presents himself at the hospital on the next out-patient day.

The author states that the combination of thymol with beta-naphthol is more efficient than the latter drug used singly and "causes less anxiety than the administration of 90 grains of thymol."

R. P. C.

Corteling (O. R.). **Beta-naphthol in Ankylostomiasis.**—*Indian Med. Gaz.* 1916. Mar. Vol. 51. No. 3. pp. 98–99.

Notes on the case of a Javanese, in British North Borneo, who was treated for ankylostomiasis with three 30 grs. doses of beta-naphthol.

On the third day after the administration of the drug, vomiting accompanied by headache set in. The temperature remained normal. The conjunctivae were deeply jaundiced and the urine was dark red in colour—"obviously due to blood." An examination of the peripheral blood was made and no malarial parasites were noted. The symptoms appeared to the writer to resemble those of blackwater fever and Sternberg's treatment for that condition was adopted, with most satisfactory results. The beta-naphthol treatment was resumed a fortnight later without any ill effects.

R. P. C.

Keith (R. D.). **Ankylostomiasis, Diagnosis and Treatment.**—*Jl. Trop. Med. & Hyg.* 1916. June 1. Vol. 19. No. 11. pp. 130–131.

The writer of this article considers that native labourers who harbour ankylostome worms, without manifesting any symptom of ankylostomiasis, are a danger to the labour force amongst which they work. They are a constant source of infection, all the more dangerous if unsuspected, and the author is of opinion that the presence of these "carriers" may explain the difficulty which is experienced in preventing the spread of the disease on estates and in mines.

Dr. Keith recommends the "systematic examination of the stools of all coolies at regular intervals, and the administration of anthelmintics to all those in whom ova are found, combined with rigorous and systematic hygienic measures." With reference to treatment, he considers that "at an early stage in the disease any of the anthelmintics usually recommended will prove efficient," whilst in later cases, with grave anaemia, he recommends the use of oil of chenopodium in 30 minim doses. This latter drug he gives as an emulsion, every hour for three hours, on an empty stomach, and followed an hour after the last dose by an aperient.

The author states that in Malaya, Java and Sumatra the treatment of ankylostomiasis with oil of chenopodium has met with great success.

R. P. C.

Stewart (F. H.). **On the Life-History of *Ascaris lumbricoides*.**—*Brit. Med. Jl.* 1916. July 1. pp. 5–7. With 4 figs.

This is a preliminary note relating to work on the life-history of *Ascaris lumbricoides*, which has been carried out by the author at Hong Kong. Although much of the work is incomplete, the results

obtained are of considerable interest, since they point to the need for an alternation of hosts in the life-cycle of the parasite. The results are briefly summarised as follows :—

1. When ripe eggs [i.e. containing mature embryos, which have developed under suitable conditions of moisture and temperature in the outside world] are ingested by the rat (*Mus decumanus*) or mouse (*Mus musculus*), the embryos are liberated from their shells and invade the tissues of their host. Of the liberated embryos, only a few are passed in the faeces.

2. Four to six days after infection the larvae are found in the blood-vessels of the lungs, liver and spleen, and symptoms of pneumonia are produced in the host.

3. On the sixth day, the larvae pass " from the blood-vessels into the air-vesicles of the lung, causing haemorrhage into them."

4. On the tenth day, the larvae are only found in the air vesicles and bronchi.

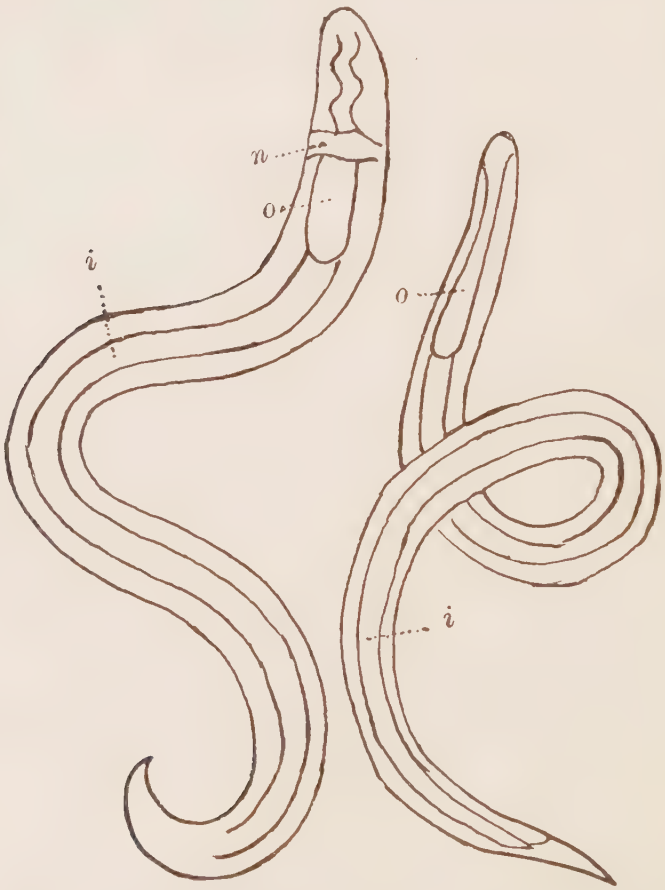


*Fig. 1. Larva from lung of rat (× 385) five days after infection. *o*, Oesophagus ; *n*, nerve ring ; *i*, intestine.

*Fig. 2. Larva from lung of rat ten days after infection (× 136). *o*, Oesophagus ; *i*, intestine.

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"If the disease [i.e. pneumonia] does not prove fatal, the host recovers on the eleventh or twelfth day," and by the sixteenth day the host is free from parasites. The largest larva observed was in the lung of a rat, ten days after infection. It measured 1·32 mm. in length and the oesophagus of this specimen measured 0·22 mm.

A list of references to the literature on the subject is appended to the article.

R. P. C.

Ross (Ronald). **The Life-History of *Ascaris lumbricoides*.** [Correspondence.]—*Brit. Med. Jl.* 1916. July 8. pp. 60–61.

In commenting upon Captain STEWART'S paper [noted above] Sir Ronald Ross relates that whilst at Bangalore, India, he put out, in the sun, slides containing the ova of the human *Ascaris*. The slides were left for some weeks and became completely desiccated. When examined six weeks later, the eggs were found to contain fully-developed actively-moving embryos.

After being moistened, the slides were replaced in the sun and left for a further period of some weeks. When examined at the end of that period, the embryos were still confined in the eggs but had ceased to move.

The writer gathers from this observation that "the humidity which Captain STEWART refers to is not essential, at least for the human parasites and for their first development."

R. P. C.

MULLAN (K. P.). **Abdominal Abscess caused by *Ascaris lumbricoides*.** [Correspondence.]—*Indian Med. Gaz.* 1916. Mar. Vol. 51. No. 3. p. 115.

This is a note on the case of an emaciated, ill-nourished girl, of twelve years of age, who was brought to the writer for the treatment of a sinus "in the right iliac fossa." The history given was that two months previously a painful red swelling, the size of a walnut, had arisen at the site at which the sinus was now seen. A week later the swelling had burst, and since that time, had continued to discharge a thin, serous fluid.

Upon examination, the sinus was found to be deep and to reach "almost to the peritoneum." The writer gave an anaesthetic and opened it up along its whole course. Three days after the operation a small *Ascaris lumbricoides* presented itself in the depth of the wound and was removed. Subsequently, santonin was given by the mouth and a further half dozen worms were passed *per rectum*.

R. P. C.

WACHENHEIM (F. L.) & BERNSTEIN (E. P.). **Two Cases of Infection with *Strongyloides stercoralis*.**—*Jl. Amer. Med. Assoc.* 1916. Apr. 8. Vol. 66. No. 15. p. 1092.

This paper gives the notes on two female children (sisters, aged six and nine years respectively) who were found to be suffering from *S. intestinalis* infection.

The children had always lived in New York, where this parasite is practically unknown.

The younger patient was found to have an eosinophilia of 11 per cent., and the elder, one of 17 per cent. The authors claim to have succeeded in ridding the patients of the parasites with thymol, and state that, after three weeks, the eosinophilia had fallen to 5 per cent. and 6 per cent. respectively.

R. P. C.

Whiddon (R. C.). **Report of a Case of *Strongyloides intestinalis*.**—*Texas State Jl. Med.* 1916. Mar. Vol. 11. No. 11. p. 604.

Notes on the case of a male patient, aged sixty-six years, who had suffered from obstinate diarrhoea, associated with marked anaemia and emaciation, for a period of five years.

The patient stated that the malady had been contracted by drinking water from an old, disused well near which he was working, in the vicinity of Oklahoma City.

During the past five years he had had from five to seven motions daily, with acute exacerbations for a day or two, when ten to fifteen stools would be passed in the day. In the whole of this period he had not once passed a formed or solid stool.

He had been treated on several occasions for the malady, but without obtaining any relief. A specimen of the faeces was sent to Dr. L. W. Kuser who found large numbers of *S. intestinalis* present and this result was confirmed by Dr. W. H. Moursund, the Pathologist to the Baylor University Medical School. No other parasites were found, either then or at subsequent examinations.

The patient was treated by the administration of thymol [dose not stated] twice weekly for four weeks, and afterwards once weekly. Although the general condition of the patient improved and a gain in weight of twenty pounds is noted, the author states that " the stools still contained nearly as many parasites as when first examined."

R. P. C.

Rodhain (J.) & Van den Branden (F.). **Recherches diverses sur la *Filaria* (*Onchocerca*) *volvulus*.**—*Bull. Soc. Path. Exot.* 1916. Mar. Vol. 9. No. 3. pp. 186–198.

By the examination of a series of natives, infected with *F. volvulus* tumours, the authors have confirmed Ouzilleau's observation as to the extreme rarity of the occurrence of *Mf. volvulus* in the peripheral blood. The research was carried out at Leopoldville [Belgian Congo], and the authors state that :—

1. Direct examination of the peripheral blood of 29 infected natives yielded constantly negative results.
2. The fractional centrifuging of 10 cc. of blood, from each of 15 infected natives, was also negative.
3. Six natives, similarly infected, whose blood (taken from the finger-tips) was examined daily, during a period of one month, gave a uniformly negative result.

With reference to the occurrence of microfilariae in the crural and inguinal glands, the authors were able to establish their presence by means of a single puncture in eleven cases out of twenty-eight.

An attempt made to demonstrate the presence of microfilariae in the serous fluid, obtained by blistering over a superficial volvulus nodule was unsuccessful.

A series of experiments was conducted with a view to determining whether carriers of *volvulus* cysts possessed, in their blood, specific antibodies capable of producing complement deviation.

Twenty-two cases were examined, and the authors conclude that patients, so infected, do not possess specific antibodies to any appreciable extent, the reaction of Bordet-Gengou being only produced in 13·6 per cent. of the cases examined. The antigen used in these experiments was an alcoholic extract of *Onchocerca volvulus*, taken from a cyst, and prepared according to the technique suggested by Porges and Meier. The presence of precipitins was not investigated.

An attempt was made to determine to what extent the eosinophile count was influenced by the injection of extracts of filariae into two monkeys. In the first case 1 cc. of an emulsion of a filaria (extracted from a cyst), in physiological salt solution, was injected into the peritoneal cavity. Two days afterwards, a drop of peritoneal fluid which was extracted showed in addition to mononuclears, a large number of eosinophile cells. No further examination was made for thirty-six days, when a further drop of peritoneal fluid revealed only a scanty number of mononuclears.

In the case of the second monkey, the sero-purulent contents of three *volvulus* cysts were injected beneath the skin of the flank. The blood was examined daily and it was noted that the eosinophile count steadily rose from 1·3 per cent. before injection, to 4·8 per cent. four days after injection. From this point the eosinophiles rapidly diminished and by the seventh day, after injection, had reached the normal level.

Experiments were also carried out with the object of testing whether mosquitoes [*Stegomyia fasciata*] and bugs [*Cimex rotundatus*] were able to function as intermediate hosts in the life-cycle of this worm. In both series the insects were fed upon a meal of blood which contained living microfilariae, obtained from a *volvulus* cyst. Four days later they were killed and examined. In no case of either series were developmental stages of the microfilariae found.

The writers call attention to the lack of uniformity which obtains in the *volvulus* tumours which they have excised. A description of the types and the gross characteristics observed are given.

R. P. C.

Dubois (A.). **Le rôle pathogène de** *Onchocerca volvulus*, **Leuckart.**—*Bull. Soc. Path. Exot.* 1916. May 10. Vol. 9. No. 5. pp. 305–309.

During a journey through the Welle District, Dubois has been able to confirm many of the observations on *Onchocerca volvulus* made by Ouzilleau. He states that the parasite is extremely common in the Lower Welle district, especially in the vicinity of the important water ways. Other filaria parasites of man, known on the Welle, are:—*Acanthocheilonema perstans* and *F. loa*. The author states that

F. bancrofti is unknown there, and that chylous hydrocoele and haematochyluria are similarly unknown. The incidence of *O. volvulus* was found to be nearly equal in the two sexes, and always less frequent in children than in adults. A series of 1,449 infected cases were examined, in order to determine the relative frequency with which volvulus tumours occupied the various locations cited below. The following list summarises the results obtained :—

Sites occupied by volvulus tumours.	No. of cases.	Percentage.
1. Trochanter	448	30·0 approx.
2. Iliac crest	420	29·0 ,,
3. Sides of thorax ..	305	21·0 ,,
4. Mixed*	276	19·0 ,,

*Situated in two or three of the preceding sites, or elsewhere.

Occasionally the tumours may be found in the sacral, pubic or scapular regions and around the knee joint. The author however considers that, in order to determine the endemic index of a locality, examination of the three sites given in the above summary will yield a sufficiently accurate result for all practical purposes. In those cases in which *volvulus* tumours cannot be found either owing to their small size or concealed position, the infection may be determined by the presence of the *Mf. volvulus* in the fluid obtained by puncture from the more or less engorged inguino-crural glands. The writer states that "*Mf. volvulus* is regularly present in the lymph of the inguino-crural glands. Its presence is less frequently established in the cervical glands." He never succeeded in finding the microfilaria in the blood.

In the case of 53 patients suffering with elephantiasis, the writer records that 38 of these were carriers of *volvulus* tumours, 11 others were determined to be infected by puncture of the groin glands and in four only was the presence of *O. volvulus* not established. The writer considers, with Ouzilleau, that "all cases of elephantiasis, in the Welle District, are infected with *O. volvulus*." Keratodermia is especially frequent amongst carriers of *volvulus* nodules, in heavily infected districts. It sometimes co-exists with elephantiasis and Dubois states that he has seen typical cases of it occurring in children. With reference to the geographical distribution of this parasite, the writer states that it is to be found throughout the whole of the Lower Welle District. Its incidence is, however, very variable in the various localities. Two series of adult natives—one of 500 individuals, the other of 150—which were examined, showed that, whilst in the former 17 per cent. were carriers of *volvulus* nodules, in the latter the carriers of nodules numbered 30 per cent. The heaviest infection was found on the Welle, between Bambili and Bondo. In that region, 50–60 per cent. of the adult population and 15–20 per cent. of the children were found to be carriers of the *volvulus* nodules. Cases of elephantiasis and keratodermia abounded there.

A table giving the results of the examination of the inhabitants of four districts near to Bambili, is included in this article.

R. P. C.

Martinez Alvarez (A.). **Observaciones clinico-microscópicas sobre la filariasis.** [Clinical and Microscopical Observations in Filariasis.] —*Bol. Assoc. Med. de Puerto Rico.* 1916. Mar. Vol. 13. No. 110. pp. 17–21. With 2 charts.

The clinical observations recorded in the above paper are drawn from the study of fifty cases of filariasis, in the district of Puerta de Tierra. They may be briefly stated as follows :—

1. Puerta de Tierra is a heavily infected filarial district, and many of the forms of the disease met with there are, clinically, atypical.
2. Filariasis should be suspected in all cases of fever occurring there, regardless of age ; the author found the infection present in patients with ages ranging from five to fifty years.
3. The absence of enlarged glands should never be taken as negative evidence of filariasis.

The results obtained by the author from his microscopical study of the blood, of the cases quoted above, were as follows :—

1. During an acute attack of filarial fever, a polymorphonuclear leucocytosis is observed. The total leucocyte count may, in consequence, rise to 30,000.
2. At the termination of an attack there is, in some cases, a periodical nocturnal eosinophilia.
3. The red blood count and the haemoglobin index both fall below the normal figure during the attack and remain low subsequently.

R. P. C.

Bockhorn (M.). **Ueber bisher unbekannte Filariablutbefunde bei gefangenen Russen.** [A Hitherto Unknown Filaria found in the Blood of Russian Prisoners.]—*Med. Klinik.* 1915. Sept. 12. Vol. 11. No. 37. pp. 1029–1031. With 3 figs.

In one of the prison camps in Germany, the writer found a small microfilaria in the blood of each of three Russian prisoners. The microfilaria was similar to, but smaller than *Microfilaria perstans.* The three prisoners were all suffering with fever, bronchitis and oedema of the legs and feet in addition to other maladies.

In his search through the literature on this subject the author has found that a not greatly dissimilar microfilaria has been described by Reichmann. This latter observer obtained his specimen from a pleural exudate, but was unable to find microfilariae in the blood of the patient from whom the exudate came.

Bockhorn's cases originally came from Samara, Siberia and Astrachan.

R. P. C.

Rodenwaldt (E.). **Bemerkung zu dem Artikel von Dr. M. Bockhorn "Ueber bisher unbekannte Filariabefunde bei gefangenen Russen".** [Observation on Dr. Bockhorn's Article "Concerning a Hitherto Unknown Filaria found in Russian Prisoners".]—*Med. Klinik.* 1915. Oct. 30. Vol. 11. No. 44. p. 1212.

In his comments on Bockhorn's paper, the author calls attention to the fact that the geographical distribution of *Microfilaria perstans* in European and Asiatic Russia is unknown ; and that the microfilariae illustrated in his article show a greater variation in size than

would be observed were they in reality the embryos of *F. perstans*. Rodenwaldt mentions the case of his own child in whose blood he found similar forms to those shown in the illustrations to Bockhorn's article. He apparently leans to the opinion that these "microfilariae" are artefacts—either shreds of filter-paper or fungi—collected during the process of preparing and staining the films.

R. P. C.

Phipps (Cadis). *Filaria sanguinis hominis.* **With report of a Case.**—*Jl. Amer. Med. Assoc.* 1916. Jan. 22. Vol. 66. No. 4. pp. 266–267. With 2 figs.

This article gives a short, and incomplete, account of the development of *Filaria bancrofti*; together with the report of a case of this infection, which had been under the author's care.

The case was treated by the intravenous injection of 0·4 gm. of salvarsan. No microfilariae were found in the peripheral blood of the patient during the night following the injection. Apart from this fact no further history is recorded.

R. P. C.

Dutcher (B. H.) & Whitmarsh (P. L.). **The Results of Blood Cultures from Thirty-Six Individuals, with their Possible Bearing on the Etiology of the So-called Filarial Diseases; and Description of a New Parasitic Bacillus, believed to be the Causative Agent of Filariasis.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. Aug. Vol. 3. No. 2. pp. 69–74.

Whilst investigating the actual relationship which exists between *Filaria nocturna* and the so-called filarial diseases the authors undertook a series of blood examinations, which resulted in their finding a certain bacterial organism in thirty-six cases of the series.

Fifteen hundred persons were examined and about three thousand examinations were made. Of the thirty-six cases in which the organism was found two were "check" cases and these the authors regard as "carriers."

The bacillus resembles in morphology and size *B. subtilis*, but the authors do not believe it to be identical with that organism.

It is described as being motile, aerobic, non-acid fast and spore-bearing. In broth it forms a thin, white, parchment-like pellicle, which it is difficult to submerge and wet. It grows more readily on plain agar than on glycerine agar, and more rapidly at 37° C. than at room temperature. On plain agar it forms a white growth which becomes yellowish in old cultures. In gelatine stab-cultures flocculi appear, which later liquefy the medium and coalesce. Coagulated hydrocele fluid is slowly liquefied. A tube of spores was rendered sterile by boiling for less than five minutes.

For this organism the authors suggest the name of *Bacillus lymphangiticus*, as they believe it to be "the cause of those diseases grouped under the designation of 'filariasis.'"

R. P. C.

Ward (Henry B.). **Gongylonema in the Rôle of a Human Parasite.**—*Jl. Parasit.* 1916. Mar. Vol. 2. No. 3. pp. 119–125. With 1 plate.

The parasite described in this paper was extracted from beneath the mucosa of the lower lip of a girl, aged sixteen years, by Dr. R. L. Covington of Jefferson, Ark. The patient stated that she had actually seen the worm on three occasions and that it moved up and down in the tissues, extending its migrations from the lips to the fauces. She had lived in Arkansas all her life and had never been out of the United States.

Dr. Covington describes the worm as being "just beneath the mucosa" and "about three-quarters of an inch in length and about the size of a No. 60 sewing thread." It was extracted by means of a needle.

The examination of the parasite was carried out by Dr. Ward and the following summarises his description. The worm measures 42·1 mm. in total length and is of nearly equal diameter throughout, tapering only a little at each extremity. The anterior extremity, for 1·4 mm. of its length, is ornamented with cuticular tubercles which are definitely arranged. A cuticular ridge runs along the lateral line, starting at a point 0·25 mm. from the anterior end and extending backwards for about 1·5 mm. A group of papillae or lips surround the mouth, and from this latter extends the "capilliform" oesophagus. The oesophagus disappears from view behind the anterior tip of the cuticular ridge. The excretory pore is situate in the mid-ventral line and is 0·6 mm. from the anterior tip of the body. This is surrounded by a peculiar papilla. The vulva is located 2·15 mm. from the posterior extremity of the body and is slightly prominent with raised lips. The anus is within 0·25 mm. of the same extremity.

Dr. Ward considers that "there can be no doubt that this specimen belongs to the genus Gongylonema in the family of the Filariidae," and that it is not improbable that infection may have been transmitted by the accidental ingestion of the croton bug or some other insect functioning as intermediate host for this worm.

The author is inclined to determine this specimen, from man, as *G. pulchrum*—an occasional parasite of the pig in both Europe and North America.

R. P. C.

Ziemann (H.). **Phenokoll bei Filariaerkrankungen.** [Phenokoll in the Treatment of Filariasis.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1915. July. Vol. 19. No. 14. p. 377.

Professor Ziemann, in the above note, states his opinion that there is no proof that this drug is of the slightest service in filarial diseases. He bases this opinion upon six cases of *F. loa* infection which he treated by the administration of Phenokoll hydrochloride.

R. P. C.

Robertson (J. A.). i. **Pepper as a Prophylactic against Filariasis** [Correspondence].—*Lancet.* 1915. Sept. 18. p. 673.
ii. **Pepper in the Prophylaxis and Treatment of Filariasis.**—*Brit. Med. Jl.* 1915. Oct. 9. p. 535.

The writer of the above notes calls attention to observations he has made [in British Guiana] regarding the use of pepper as a prophylactic agent in filariasis.

In support of his observation, he cites the cases of the aboriginal Carib Indians and East Indians—both "creole" and immigrant—who take large quantities of pepper in their food, and amongst whom filariasis is almost unknown. On the other hand, the Portuguese, Negroes and other inhabitants, who take little pepper in their food, are those in whom filariasis is most commonly seen.

Assuming that pepper was of prophylactic value in this disease, he experimented with *Tinct. capsici* in the treatment of cases of lymphangitis and acute filarial fever. He found that both conditions yielded promptly to the drug.

He suggests that Piperine, if used in the treatment of these cases, would yield equally satisfactory results.

R. P. C.

Davis (George G.) & Hilton (J. J.). **Guinea Worm Disease.**—*Jl. Amer. Med. Assoc.* 1915. Oct. 2. Vol. 65. No. 14. pp. 1175–1176. With 2 text-figs.

The above article embodies a short account of guinea-worm disease and notes on a case of that infection occurring in a member of the British Expeditionary Force, in France.

The case was that of a non-commissioned officer of the Cameron Highlanders who had spent five years, of his seven-and-a-half years' service, in India.

Whilst he was on duty, one worm measuring two feet in length was removed from the flexor aspect of the left forearm. The removal was effected by means of a lead pencil around which the worm was gradually wrapped.

At the same time he noticed slight flesh wounds below the internal malleolus of the left foot and on the dorsum of the right. These wounds the patient attributed to injuries from barbed wire obtained whilst bathing behind the trenches. Subsequently both wounds became septic and he was admitted to hospital for treatment. Under anaesthesia one entire worm and several parts of one or more other worms were removed from the left foot, and from the right foot parts of still further worms were extracted.

The writers state that the complete worm measured 32 cm. in length and 3 mm. in circumference.

R. P. C.

Barlow (Nathan). **Intestinal Parasites in Spanish Honduras.**—*New Orleans Med. & Surg. Jl.* 1915. Oct. Vol. 68. No. 4. pp. 271–274.

Dr. Barlow gives, in this paper, the results of a thousand examinations of faeces obtained from natives of Honduras, Nicaragua, Salvador and Guatemala. Originally it was the writer's intention to give the

figures for the natives of these several countries separately, but finding no appreciable difference in the percentages they are combined in the subjoined lists.

At least six cover-glass preparations were examined in each case. In the first hundred cases all those in which hookworm infection was not found were re-examined by Bass's centrifugal method and received thymol. As in only one case was a positive result obtained after this re-examination, Barlow assumes his figures to be accurate within 1 per cent. The degree of incidence was as follows :—

	Natives (800 cases).	Negroes (100 cases).	Whites (100 cases).
Free from parasites ..	5·5 %	3·0 %	27·0 %
One species only ..	38·5 %	47·0 %	29·0 %
Two or more species ..	56·0 %	50·0 %	44·0 %

The percentage infection with the various parasites is given in the following list :—

	Hook-worm.	*Trichuris trichiura.*	*Ascaris lumbri-coides.*	*Strongyloi-des intesti-nalis.*	*Taenia saginata.*
Natives (800 cases)	79·25%	49·0%	44·5%	2·5%	0·87%
Negroes (100 cases)	54·00%	47·0%	40·0%	10·0%	4·00%
Whites (100 cases)	20·00%	38·0%	13·0%	3·0%	3·00%

The hookworm infections were due to *Necator americanus* with two exceptions. One of these was a West Indian negro in whom *Ankylostoma duodenale* was found and the other [race not specified] was infected with both *Necator* and *Ankylostoma*. In regard to *Oxyuris vermicularis*, only a few children were examined and its prevalence cannot be definitely stated. Dr. Barlow is of opinion that this parasite is less common in Honduras than " in civilised countries."

In addition to the above parasites one case of *Echinorhynchus* (?) is noted and reference is made to a taeniform parasite occurring in two other patients. With regard to this latter, it is described as being segmented, possessing a head resembling the scolex of *Dibothriocephalus*, but furnished with a single sucker leading into an alimentary canal. Operculated ova were found in both cases.

R. P. C.

Frey (J. H.). **Helminthiasis at Texas State Orphans' Home.**—*Texas State Jl. Med.* 1915. Aug. Vol. 11. No. 4. pp. 229–231.

The Texas State Orphans' Home had, at the time when Frey compiled the following figures, 270 children in its care ; and of these 118 (47·7 per cent.) were infected with intestinal parasites.

The sexes were approximately equally represented on the roll, but of those infected 53·3 per cent. were males. Double infections were noted in eleven of the cases.

The species represented and the percentages obtained are as follows:—

Uncinaria	57·6 %
Hymenolepis nana	32·6 %
Oxyuris vermicularis	6·2 %
Trichocephalus trich.	2·3 %
Taenia saginata	0·7 %

The large percentage of children infected with *Hymenolepis nana* is worthy of note and the author refers to Stiles's prophecy of twelve years ago that "*Hymenolepis nana* will be found to be the commonest tape worm in the United States." With regard to the connection which exists between eosinophilia and the presence of intestinal parasites the author gives the following figures :—

Degree of Eosinophilia.	Percentage of cases found to be infected with Helminths.
0·0 % – 2·0 %	None.
2·0 % – 5·0 %	23·1 %
5·0 % –10·0 %	81·3 %
10·0 % and above	100·0 %

R. P. C.

Chester (R. W.). **Intestinal Parasites in the Central Jail, Rajahmundry.** —*Indian Med. Gaz.* 1916. Mar. Vol. 51. No. 3. pp. 96–98.

During the period October, 1914–August, 1915, the stools of 2,296 convicts in the Central Jail, at Rajahmundry, were microscopically examined ; and, of that number, 71·30 per cent. were found to be infected with one or more species of intestinal parasites.

Of the parasites detected, 6·92 per cent. were protozoa. The remainder were helminths and occurred in the following percentages :—

Ankylostoma duodenale	46·43 %
Ascaris lumbricoides	24·60 %
Oxyuris vermicularis	15·71 %
Trichocephalus trichiuris	2·67 %
Taenia [species not stated]	2·29 %
Strongyloides stercoralis	1·38 %

Dr. Chester states that no district in the Madras Presidency, from which prisoners are sent to the Rajahmundry Jail, is exempt from infection with some kind of intestinal parasite ; and no caste appears to be free. With regard to occupation he notes that infection with ankylostomes was chiefly found amongst coolies and cultivators.

The author concludes his paper by remarking that "if intestinal parasites do not always cause a high death-rate, they are certainly responsible for a large amount of sickness and loss of wage-earning capacity among those classes that can ill-afford to be out of work."

He considers that there is need for active preventive measures in South India, "where ankylostomiasis tends to become widespread owing to the habit of depositing dejecta in fields and open places."

R. P. C.

Fauntleroy (C. M.) & Hayden (R.). **A New Method of examining Stools for Eggs.**—*U. S. Nav. Med. Bull.* 1915. Jan. Vol. 9. No. 1. pp. 81–82.

The following method of preparing specimens of faeces for the examination for eggs is based on the fact that when the faeces are mixed with aniline gentian violet, the faecal matter takes up the stain whilst the eggs do not. This is in consequence of the inability of the stain to penetrate the egg-membrane. [Since alcoholic stains do penetrate the egg-membrane, they are useless for this purpose.]

The authors have used this method in the examination of over a thousand stools with uniform success. The technique which they advise is as follows :—

1. About two grams of faecal material is thoroughly mixed with five cubic centimetres of a two per cent. aqueous solution of lysol in a centrifuge tube ; and centrifuged, at high speed, for one minute.
2. The supernatant fluid is decanted and fresh lysol solution is added to, and thoroughly mixed with the sediment. This is again centrifuged, and the process is repeated three times.
3. Upon completion of the centrifuging, a small portion of the sediment is transferred to a clean slide, by means of a clean pipette, and a drop of aniline gentian violet is added and mixed with the sediment. A coverslip is then placed upon it and the specimen is ready for examination.

The authors state that the lysol solution, mentioned in the technique, is not an essential; but is used merely for disinfectant purposes.

R. P. C.

Stiles (C. W.). **Intestinal Infections. The School Grades attained by 2,166 White School Children (1,062 Boys, 1,104 Girls) in the City of X. Classified by Age, Sanitation and Intestinal Parasites.**—*U.S. Public Health Rep.* 1915. July 9. Vol. 30. No. 28. pp. 2060–2067.

This article is a further contribution to a series, which Professor Stiles has written, regarding the connection which exists between home-sanitation and the progress made by children at the State schools.

He has noted that a definite relationship is found between defective sanitation and coprophagia, and explains the larger proportion of intestinal parasites found in children coming from homes with defective sanitation by this fact.

Regarding the influence which is exercised by these parasites on the progress made by the children at the schools, he is of opinion that

Entamoeba coli and *Lamblia* do not affect the position occupied by the scholars in the school grades; whilst *Ascaris lumbricoides* and *Necator americanus* he regards as factors which must be considered as of practical importance, in connection with retardation of progress, "even in cases of relatively light infection." The data for infection with *Trichomonas*, *Oxyuris*, *Trichuris* and *Hymenolepis nana* were insufficient to warrant any deductions being drawn in regard to these parasites.

R. P. C.

Seidell (Atherton). **The Excretion of Thymol in the Urine.**—*U.S. Public Health Service. Hygienic Laboratory Bull.* No. 101. 1915. Aug. pp. 43–51.

As a result of work carried out in collaboration with W. H. Schultz, the author has previously reported that only insignificant amounts of ingested thymol are excreted in the faeces.

In this article the fate of the remaining portion is dealt with, and from experimental work on dogs most interesting results have been obtained.

The author deduced, from the small amount of the drug recovered in the faeces, that thymol is almost completely absorbed from the alimentary canal and must therefore be oxidised in the tissues or excreted in the urine. Blum's recovery of thymol glycuronate from the urine had conclusively demonstrated that excretion in the urine does take place to some extent, and the author has devised a method of recovering and estimating the amount which is got rid of by this channel.

The method of recovering the drug consisted in the steam distillation from strongly acid solution and subsequent redistillation of the nearly neutral distillate. The second distillate was titrated by the bromine-hydrobromic acid method [Seidell].

The application of this method to samples of urine from dogs, which has been previously dosed with thymol, showed that 41–46 per cent. was recovered when doses of 0·3–0·7 gram were given and 31–36 per cent. when larger doses of 1·2–1·8 grams had been ingested.

The author states that the simultaneous administration of olive oil caused slight, if any, effect upon the percentage of excreted thymol. "It is a question, therefore, whether oils really increase the amount of absorption of thymol or only the rate."

The urines obtained from two boys (of nine and thirteen years of age respectively), who were receiving thymol treatment for hookworms, gave results which agreed pretty accurately with those obtained from the experiments on dogs. Each boy received 0·9 gram thymol and the amount recovered from the urine [collected for twenty-three hours after the administration of the drug] was in one case 35 per cent. and in the other 33 per cent.

Referring to the amount of thymol that is not excreted in the urine and faeces (a half to two-thirds), the author considers it probable that

thymol is present in the blood stream passing through the lungs and that a certain amount would, doubtless, be lost by volatilization. In this connection, he cites Cushny's observations regarding the occurrence of "marked congestion and even consolidation of the lungs" in fatal thymol poisoning, and Langerhan's records of autopsies, made on cases which had terminated fatally after the absorption of phenol from the intestinal tract, in which marked bronchitis and laryngitis were noted.

R. P. C.

Weinberg (M.) & Séguin (P.). **Recherches biologiques sur l'Eosinophile. Deuxième partie. Propriétés phagocytaires et absorption de produits vermineux.**—*Ann. Inst. Pasteur.* 1915. July. Vol. 29. No. 7. pp. 323–346. With 2 plates.

In this article the authors give the results of a series of experiments, made with a view to determining the limitations of the phagocytic properties possessed by the eosinophile leucocytes.

The experiments were made both *in vitro* and *in vivo*; and, in the latter case, guinea-pigs were used throughout. In both cases, it was found that the eosinophiles are capable of engulfing not only a large number of species of bacteria, but also protozoa and the red blood cells. It is noted, however, that more intense phagocytosis was observed in the presence of bacteria than in the presence of the cellular organisms.

The authors state that "the experiments carried out with *B. subtilis* and *B. coli*, the protozoa and the red blood cells, enable them to affirm that the eosinophiles are capable of digesting, as well as engulfing, these elements."

The eosinophiles display their phagocytic properties equally well *in vitro* and *in vivo* (peritoneum, subcutaneous cellular tissue and the circulating blood).

A further series of experiments was carried out, with the object of ascertaining the part played by the eosinophiles in the presence of helminthic products. From these it was found that after the eosinophile cells had been in contact with hydatid fluid at 37° C. for one hour, their phagocytic properties were lost. Similar exposure, in the case of the polymorphonuclear and mononuclear leucocytes, left their phagocytic powers unaffected.

The hydatid fluid was also found to have suffered in the loss of its antigenic power—the antigen having been fixed by the eosinophile cells. The eosinophiles of animals previously immunised against hydatid fluid fixed the antigen with greater facility than did the eosinophiles from animals not so treated. It was also established that this fixation of the hydatid antigen takes place both at low and at moderately high temperatures.

The authors consider that, having absorbed the toxic products from the hydatid fluid, the eosinophiles play an important role in the elaboration of the specific antibody.

R. P. C.

Penschke. **Behandlung von Wurmkranken mit Filmaronöl.** [The Treatment of Worm Infections with Filmaronöl.] — *Arch. f. Schiffs- u. Trop.-Hyg.* 1915. Mar. Vol. 19. No. 5. p. 149.

The results obtained from the treatment of two series of cases with Filmaronöl are recorded in the above note.

In the first series, treated at Tanga [German East Africa], there were forty cases. Thirty-three of these received 10 gm. each, two had 15 gm. each and five 20 gm. each. The examination of the faeces, subsequent to treatment, showed that 91·9 per cent. of the cases still continued to pass worm ova.

In the second series, treated at Lindi [German East Africa], there were thirty-one cases, and to each was given 10 gm. of the drug. The subsequent examination of the faeces showed that 60 per cent. of the cases retained their infections. One case, in this latter series, died from exhaustion, four days after the administration of the drug.

R. P. C.

MISCELLANEOUS.

GOLD COAST. **Report of the Accra Laboratory for the Year 1914.** [J. W. Scott MACFIE.]—56 pp. With 2 plates and a map. 1916. London: J. & A. Churchill. [Price 5*s.* net.]

With the exception of five pages this report is occupied by an account of "routine examinations and special investigations." It is noted that research work was only undertaken in the last four months of the year so that most of the investigations are incomplete.

Blood examinations.—Of the malarial parasites detected in Europeans and natives malignant tertian formed about 90 per cent. The author notes the rarity with which crescents were encountered in these infections. He does not suggest any explanation beyond referring to STATHAM'S view [this *Bulletin*, Vol. 4, p. 484]. In a European patient malarial parasites were found which simulated the type described by STEPHENS under the name *P. tenue* [*loc. cit.* Vol. 3, p. 432]. Macfie thinks that the parasites were the same as those figured by BALFOUR and WENYON in a more recent paper [*loc. cit.* Vol. 5, p. 53]. He suggests they were merely unusual forms of *P. falciparum*. They illustrate the occurrence of great amoeboid activity in these infections. In another case malarial parasites were found with no detectable nuclear matter. The majority were typical specimens of *P. falciparum*, but the rest had no material that assumed the chromatin tint when stained by Leishman's method. The author has not been able to find any record of the occurrence of such parasites. In a case of fatal blackwater fever the cytoplasm of the parasites remained almost unstained; the parasites were in consequence extremely difficult to detect. It is suggested that this might account for some of the cases of blackwater fever in which malarial parasites have not been discovered. The infection was believed to be one of *P. falciparum*. An account is given of a fatal and exceptionally intense infection with malaria [this *Bulletin*, Vol. 5, p. 243]. The Arneth counts made by the writer have been already reported on [*loc. cit.* Vol. 6, p. 345].

The section headed "A Few Blood Puzzles" contains an account of forms of neutrophile leucocytes which were obtained by puncture of an indurated mass in the groin of a European; the nucleus instead of being composed of lobes connected by fine filaments was broken up into a number of separate fragments. Similar cells have been figured by BALFOUR, ROWLEY and O'BRIEN. All explain them as degenerated forms of the polymorphonuclear neutrophile leucocytes.

Under the heading "Examination of Sputum" is an account of two cases of bronchial spirochaetosis [this *Bulletin*, Vol. 6, p. 211]. Details of some post mortem examinations of special interest are given. For an account of the examination of blood films obtained from the Accra Slaughter-house see this *Bulletin*, Vol. 7, p. 91. Of the trypanosomes found in cattle *T. vivax* was in the majority, *T. congolense* coming next and *T. pecaudi* last. Of 95 sheep examined *T. vivax* was found in three and *T. congolense* in two, and in 94 pigs *T. congolense* was found in five. In 80 goats examined neither trypanosomes, piroplasms nor filaria embryos were found; the author draws attention to the fact that goats have been credited with being a natural reservoir for *T. vivax*. The trypanosome infections of these animals

are discussed in some detail with charts showing the distribution according to length and breadth of *T. congolense* (*nanum*). Of 33 equines examined 20 were found infected with trypanosomes, the majority with *T. pecaudi*. It is noted that *T. pecaudi* is almost invariably fatal in horses, *T. vivax* never so and that *T. congolense* has an intermediate virulence; however *T. vivax* incapacitates its victims for a long time.

Examinations of Mosquito Larvae.—A table shows the results of examinations of domestic mosquitoes in Accra for the last part of 1912 and the whole of 1913 and 1914.

"From an examination of this table it is evident that *Stegomyia* (78·34 per cent.) is by far the most common genus of domestic mosquito in Accra, and that *Anopheles* (1·81 per cent.) is rarely found, at any rate in the native compounds. All the *Stegomyia* mosquitoes appear to have been *S. fasciata*; those of the genus *Culex* were in order of greatest frequency of occurrence: *C. fatigans*, *C. decens*, and *C. tigripes*; whilst the only species of *Anopheles* recorded was *A. costalis*."

It is noted as somewhat remarkable that of the 32 species of mosquito recorded as occurring at Accra only five should have been represented in the collections of larvae sent to the laboratory for identification. A chart is given showing the distribution of Stegomyia, Culex and Anopheles in the blocks into which Accra is divided for the purposes of sanitary organisation. The different genera are shown by coloured discs. Stegomyia and Culex were found in nearly every block and Anopheles in several, in many instances in the heart of the town in pots and other domestic utensils. An account is given of an experiment bearing on the biology of *Stegomyia fasciata*, in which the mosquitoes had the opportunity of feeding both by day and by night [*cf* this *Bulletin*, Vol. 5, p. 309]. Naphthalene was tried suspended above the surface of water for the destruction of mosquitoes. It was found to have little practical value.

A summary is given of the examinations made in the laboratory, and a large coloured plate of blood parasites of man and animals.

A. G. B.

NIGERIA. **Annual Report, 1914, Medical Research Institute.** [A. CONNAL & H. Sinclair COGHILL.]—22 pp. 1916. London: Published by the Crown Agents for the Colonies. [Price 2*s.* 6*d.* net].

Yellow fever investigations were carried on throughout the year. The results have already been reported in full to the Yellow Fever (West Africa) Commission [this *Bulletin*, Vol. 7, p. 288 *et seq.*]. A synopsis is given.

Malaria.—The subtertian parasite was successfully cultivated on four occasions. Three of the patients were natives (two lepers) and one a European. An account of the symptoms, appearance of the parasites, and results is given. The authors write:—

"Ordinary room temperature in this part of the tropics is apparently quite suitable for the growth of the parasite by Bass's method of cultivation, when the tubes are kept in the dark. The occurrence of phagocytic phenomena in the culture from all three natives, and the absence of these phenomena in the cultures from the European support the contention that the adult native has some degree of immunity to malarial infection. This partial immunity enables him at times to recover from the infection without the use of quinine. All three natives have been under observation

for over six months since their attack, and no relapse or reinfection has followed. The statement by J. G. and D. Thomson in the paper above alluded to, that the pigment in subtertian parasites (*Plasmodium falciparum*) collects into a definite mass at an early stage of growth, is confirmed by the results obtained at the Institute.

"The appearance of crescents in the culture tubes has apparently not been previously described, and but slight reference has been made in the literature to the marked phagocytic phenomena which were noted in the present cases."

Three young monkeys were found to harbour malarial parasites. A note of these cases has been published [this *Bulletin*, Vol. 4, p. 95]. Two Bass cultures were made from a monkey at intervals of six months; the results are given. Transmission experiments were made with five species of mosquito with negative results and no developmental forms were found in mosquitoes on dissection.

Blackwater fever.—Dr. Neale reported an unusual complication in three consecutive cases, an ulcerated condition of the fauces. The ulceration was deep, and tended to spread rapidly.

Trypanosomiasis.—Blood smears from 126 pigs were examined and *T. pecorum* was found in 12. Of blood films from 22 dogs seven contained a trypanosome of the *brucei* type. The remains of a large herd of cattle brought to Lagos from the Northern Provinces were examined. Deaths at the time were very numerous. *T. vivax* was present in 44 out of 54 animals and 15 harboured Babesia in addition. An account is given of treatment by atoxyl and salvarsan. It was unsuccessful.

Ankylostomiasis.—The authors think it "possible that ankylostomiasis in the sense of a grave and often fatal illness exists in West Africa to a greater extent than is generally known. . . . It is certain that a very large percentage of the natives harbour ankylostomes and also that Europeans not infrequently become infected."

Typhoid fever.—Nine Widal reactions were done; only one gave a positive reaction. Post mortem specimens were received from a fatal case in a native at Kaduna.

Tumours.—Tumours or portions thereof were sent from 14 cases in natives; 11 were sarcomata and three were scirrhus cancers.

Entomology.—Dr. Dalziel sent regular collections of mosquitoes from Lagos and its neighbourhood. The species received for each month are detailed. He also sent samples of larvae found by the sanitary inspectors during their rounds. Larvae of ten species were obtained. These were in order of frequency:—*Stegomyia fasciata*, *Culiciomyia nebulosa*, *Anopheles costalis*, *Ochlerotatus irritans*, *Culex decens*, *C. tigripes*, *C. duttoni*, *C. insignis* and *C. grahami*.

Cyclops were also found. Stegomyia larvae, when they occurred with other species, were most commonly associated with *Culiciomyia nebulosa* and, in order of frequency, with Psychodids, *Anopheles costalis* (in wells) and *Ochlerotatus irritans* (in crab holes). The report closes with a table of the mosquito larvae.

A. G. B.

Bombay. Report of the Bombay Bacteriological Laboratory for the Year 1914. [Major W. Glen Liston, Director, Bombay Bacteriological Laboratory.]—14 pp. 1916. Bombay: Printed at the Government Central Press. [Price 4*a.* or 5*d.*]

This report is divided into Part I, which deals with work connected with plague and Part II, concerned with the work of the laboratory as the Provincial Bacteriological Laboratory.

Part I.—The number of doses of anti-plague vaccine sent out was 812,942, a greater amount than in any previous year except 1911; the largest demand was from the United Provinces. Some carefully compiled statistics of the results of inoculation in the Dharwar District, Bombay Presidency, are given. These figures are discussed. They concerned 311 inoculated and 344 uninoculated persons. After necessary corrections to make the two groups as far as possible comparable, it is concluded that the uninoculated were attacked three times more frequently than the inoculated and that the latter had nearly ten times fewer deaths. "These figures show that the vaccine as at present issued from the laboratory maintains a high degree of efficiency."

Experiments were made on rats to determine whether two small doses of vaccine were as efficient in producing immunity as a single large dose, the large dose in the case of man causing a severe reaction. The double dose having been found more efficient in rats than the single, it was tried on man. It is recommended to give 1 to 2 cc. followed a week later by 2 to 4 cc. The severity of the reaction is lessened and a high degree of immunity is obtained.

The fleas of rats caught in Bombay, Coonoor and Ootacamund were carefully examined to determine the frequency of *Xenopsylla astia*, first reported from Ceylon [see this *Bulletin*, Vol. 3, p. 205]. For Bombay there were 18.5 per cent. *astia* as against 80·6 per cent. *cheopis*; in the other places *astia* formed 0·5 per cent. and *nil* against 87·5 and 91·9 per cent. *cheopis*. Of 210,080 dead rats examined 12,530 were found plague-infected.

Part II.—After an account of the routine work the author passes to research work on guinea-worm disease. Of 159 persons in a certain village 51, who had long been resident there, never suffered from the disease while 70 had suffered. The sole water supply is a small well. No explanation is offered. Of the persons attacked some suffered almost every year, others once, twice or thrice. It is shown that by a moderate outlay this cause of disability could be eliminated, with a net gain in cash when the loss of wages is considered.

Some studies on the tubercle bacillus were made by Dr. Soparkar. Captain Taylor, I.M.S., has reported on the water supply of Aden.

A. G. B.

Federated Malay States. 14th Annual Report of the Institute for Medical Research, Kuala Lumpur, 1914. [Henry Fraser.]—73 pp. 1915. Kuala Lumpur: Printed at the Federated Malay States Government Printing Office.

. *Beriberi.*—Recent criticisms of the rice theory of beriberi are discussed under the following headings:—Beriberi as a place disease;

Beriberi as a disease caused by a micro-organism and directly communicable from person to person; Beriberi as a disease of protozoal or other origin transmitted by an intermediate host such as bugs, lice or fleas, etc. The author asks opponents to remember that "their observations do not necessarily invalidate the conclusions arrived at in regard to the origin of the disease elsewhere. Facts rather than surmises are now necessary if they would combat effectively a theory whose application in practice has been attended by widespread and beneficial results among the rice-eating peoples of the Orient."

Leprosy.—This section [pp. 6–51] has been already summarised in this *Bulletin* [Vol. 7, p. 185]. The subject is considered under the headings: Fish and leprosy, Leprosy and animals, Leprosy and Kedrowsky's bacillus, Karlinski's bacillus, the Wassermann and Luetin Reactions in Leprosy. No culture of a leprosy bacillus was obtained on fish media inoculated from nodules. The author did not succeed in transmitting leprosy to any of 70 animals. He did not succeed in growing the leprosy organism.

Bacillary dysentery.—An enquiry was undertaken as to the characters of the bacilli commonly associated with dysentery in the F.M.S. Stools from dysentery cases in which amoebae could not be found were used. They were streaked on Drigalsky-Conradi medium. Non-lactose fermenting colonies were transferred to + 10 agar medium and on the second day after isolation were tested for their fermentation reactions in the various sugar media. They were also tested by the agglutination reaction with immune sera prepared from the Shiga-Kruse and Y strain of Hiss and Russell. One hundred and twenty-nine cases were dealt with, and 53 strains of dysentery-like organisms were isolated from 49 cases. The strains are tabulated, with the sugar reactions. The organisms fall naturally into two groups—those that ferment dextrose, laevulose and galactose only and those that ferment mannite as well. Organisms of Group I, the *B. dysenteriae* of Shiga-Kruse, were agglutinated only by the specific immune serum; organisms of Group II, *B. pseudodysenteriae*, were agglutinated by an immune serum prepared from strains of the Y bacillus.

Cholera.—Experiments were carried out to test the viability of freshly isolated cholera vibrios in water from various sources. "A series of observations showed that such cholera vibrios inoculated into water drawn from the river at Alor Star could be recovered from it as long as 80 days thereafter and that they were unchanged in their essential characters. Similar numbers of cholera vibrios inoculated into similar quantities of Kuala Lumpur tap water were dead in less than 24 hours in nearly every case." The precise explanation was not obtained.

Luetin reaction in syphilis.—This section is furnished by Dr. Fletcher. The reaction was tested on a group of 130 syphilitics. It was positive in 79 cases and negative in 51. The proportion of positive results was least in primary syphilis, greater in secondary and greatest in the tertiary stage. Of these cases 109 were tested by the Wassermann reaction. "There was no more agreement in the results of the two reactions than is accounted for by chance; in the series of 109 cases the results were the same in 56 and at variance in 53. This shows that the substance which gives rise to a positive Wassermann reaction is not the same as the substance which causes a positive response to

an injection of luetin." In ten of the syphilitic cases both reactions were negative. The author describes two of these cases and concludes that among the negative cases there were at least one case of active secondary syphilis and one case of active tertiary syphilis. Both these reactions were tested on a second group consisting of 82 persons suffering from beriberi, malaria and leprosy respectively. Several of these reacted to the Wassermann test, but none to the luetin test. The conclusion is that the action of luetin is specific, but that the proportion of positive reactions obtained was much smaller than that obtained by NOGUCHI. The author attributes this either to imperfect storage impairing the reliability of the sample, or difference of treatment of the patients. It is concluded that when performed in conjunction with the Wassermann reaction the luetin test is of great value. The 130 syphilitic cases are tabulated, with information as to the duration of infection, the principal features, the stage and the result of the two reactions.

Medical entomology.—A short report is furnished by Dr. STANTON. The contents have been published in papers already reviewed.

The Report closes with sections on the precipitin test for the origin of blood stains, the problem of rat destruction (wherein is shown the uselessness of viruses), and an account of the examinations carried out in the laboratory.

A. G. B.

LEVY (R. L.) & ROWNTREE (L. G.). **On the Toxicity of Various Commercial Preparations of Emetin Hydrochlorid.**—*Arch. Intern. Med.* 1916. Mar. 15. Vol. 17. No. 3. pp. 420–443. With 8 figs.

The authors commence by giving details of two cases treated with emetine. The first, a case of chronic amoebic dysentery, received 29 grains in 20 days and suffered from diarrhoea, muscular weakness and acute renal insufficiency followed by death. The other, an anaemic woman with pyorrhoea alveolaris, received 2 grains spread over four days and recovered after diarrhoea with blood and pus in the stools and toxic delirium. Experiments were made on 62 animals, dogs, cats and rabbits, and five commercial preparations of emetine hydrochloride were investigated. Points particularly observed in the animals were: (1) toxicity, (2) effects on the circulation and respiration, (3) pathological changes, (4) effect on the coagulation of the blood, (5) effect on renal function and the development of acidosis. These points are discussed in turn, and a series of graphs is given.

The authors give a summary of previous experimental work from MAJENDIE and PELLETIER (1817) to LOWIN (1902). Their own pharmacological and pathological findings were in accord with those given in the summary. Two new facts are that by electro-cardiagraphic studies it has been shown that the cardiac irregularity produced by emetine poisoning is due to fibrillation of the ventricles, from which the animals may recover, and Professor HOWELL has shown that there are alterations in the clotting properties of the blood.

A section follows on the ill effects following the clinical use of emetine. The authors have collected 20 cases, which they tabulate; in six of these less than ten grains were given. All recovered but their

own case. The symptoms included diarrhoea with blood (4 cases), diarrhoea (3 cases), peripheral neuritis (5 cases), muscular paralysis (1), muscular weakness (1), purpuric eruption (1), toxic delirium (1). The following suggestions are presented :—

"Patients may differ markedly in their susceptibility to the drug, and the various commercial preparations vary widely in toxicity. . . . . The treatment should be given in courses, at intervals of several days or a week. The subcutaneous route is the one of choice. Individual dosage and the duration of each course must be determined by the exigencies of the case. One-third grain three times a day for a week or ten days is usually a safe dosage in amebic infections. It is rarely necessary to give more than 1½ grains daily. In the treatment of pyorrhea, Bass and Johns advocate ½ grain daily for from three to six days, and maintain that no case need have more than six days' treatment. Under ordinary circumstances this seems well within the margin of safety. It must be borne in mind, however, that the administration of even relatively small doses over a long period of time may prove harmful. . . . . Intravenous injections should be employed only in extreme cases. If this mode of administration seems imperative, small doses, well diluted (½ grain in 100 cc. salt solution) should be slowly given, and the blood pressure should be carefully observed during the injection."

[In those cases in which peripheral neuritis was attributed to emetin administration it is not stated whether due consideration was given to the fact that this condition has been stated to occur after dysentery, irrespective of emetin.]

A. G. B.

Balfour (Andrew) & Pyman (Frank Lee). **The Toxicity of Emetine.** —*Jl. R. Army Med. Corps.* 1916. Jan. Vol. 26. No. 1. pp. 35–42.

This is a compilation for the benefit of medical officers serving with the Army. An account is given of the meaning of "emetine," at first applied to a mixture of substances, and of the formulae which have been attributed to it. Carr and Pyman showed that it is a monomethyl ether of cephaeline and has the formula $C_{29}H_{40}O_4N_2$. Emetine hydrochloride, $C_{29}H_{40}O_4N_2$, 2HCl is readily soluble in warm water, one part in about four parts of water at body temperature. Aqueous solutions can be sterilised without becoming decomposed. An account is given of the action of emetine on various animals, and what is known of the toxicity of emetine to man is reproduced. The authors write :—

"Medical officers treating cases of amoebic dysentery with emetine will do well to remember :—

"(1) That emetine is a very costly drug.

"(2) That if it is going to do good its beneficial action is generally quickly apparent.

"(3) That it is useless, unwise and wasteful to subject patients to repeated, long-continued courses of the drug. We know very little about the possible cumulative effect of emetine. There may be none, but in any case two short courses of the drug in appropriate doses will *usually* suffice to cure a case of amoebic dysentery. This would necessitate a primary administration in all of from ten to fifteen grains and accords with the experience of Low in his recent article on the treatment of amoebic dysentery [see this *Bulletin*, Vol. 7, p. 199].

"(4) That emetine may itself produce and keep up a certain degree of diarrhoea and that it is important to distinguish this drug-produced diarrhoea from that caused by intestinal disease."

Attention is drawn to Dr. Dale's paper in the *British Medical Journal* [*loc. cit.*, p. 237].

A. G. B.

SILER (J. F.). **Medical Notes on Jamaica,* British West Indies. Part One: General Information concerning Jamaica. Its Prevailing Diseases.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1916. Feb. Vol. 3. No. 8. pp. 433–458.

In 1913 Dr. SAMBON invited the Thompson-McFadden Pellagra Commission to take part in an expedition to the West Indies for the purpose of investigating the epidemiology of pellagra. The author and Mr. JENNINGS undertook the journey and reached Jamaica in September 1913. The position and size of the island are described. It contains 4,200 square miles [about half the size of Wales]. It is mountainous, the highest peak having an altitude of over 7,000 feet; it has consequently a large range of temperature. Springs abound along the coast, but in districts in the middle of the island it is at times very difficult to secure water at all. In such districts the peasants may have to walk from 10 to 20 miles in years of drought. In one of these sections an extensive focus of pellagra was found. The population (1911 census) consists of white, 15,600, coloured and black, 793,000, East Indian, 17,300. The birth-rate for 1912 was 39 per mille, the death-rate 22·1 per mille. The East Indians are indentured coolie labourers; more than 15,000 of them have resided in Jamaica for more than ten years. The principal exports are bananas and other fruits, bananas being by far the most important. The houses are constructed of wood, are of one story and consist of one to two rooms; the ventilation is poor, and at dusk every door and window is tightly closed. The barracks for the indentured labourers are sometimes superior in construction, but not as a rule. The methods of disposal of human excreta vary from a water carriage system in the upper circles to a pail system in some of the institutions and no system at all in the country. Soil pollution is universal. An account is given of the staple foodstuffs. The organisation of the medical service is described; it is considered to be excellent. Besides two hospitals at Kingston, a lunatic asylum and a lepers' home, there are 28 district hospitals. During the year 1912 27,000 patients were treated in these hospitals, of whom 18,000 were indentured coolies, that is to say two-thirds, though the coolies only make up two per cent. of the total population.

Prevailing diseases.—Syphilis and *yaws* are very common. Yaws is believed to be commoner in the Jamaicans than in the indentured coolies. In the year 1912 over 10,000 persons received treatment, which in 349 cases consisted of salvarsan.† The medical men are enthusiastic advocates of this treatment, as is shown by extracts from a local report. *Malaria* ranks highest among diseases as the cause of admissions to hospitals. During the same year the total admissions to district hospitals were 8,599. The disease occurs with greatest frequency in the north-eastern portion of the island, which is given largely to the cultivation of bananas. "The superintending medical officer expresses the opinion that the cultivation of bananas and malaria go hand in hand and that the necessary trenching required in banana culture furnishes excellent breeding places for mosquitoes."

* For a similar account of Barbados see this *Bulletin*, Vol. 6, p. 349.

†In 1915 Dr. A. A. ANDERSON reported that 1,127 cases had been cured by salvarsan or neosalvarsan in the operations of the travelling dispensary.

In this part of the island practically all admissions for malaria are labourers from banana estates. *Anopheles albimanus* is the principal carrier; five other malaria transmitting mosquitoes occur. Malaria prophylaxis is not practised systematically. Mosquito control work is considered to be prohibitive under prevailing economic conditions.

Both bacillary and entamoebic types of *dysentery* are common. The most common method of spread is probably through the medium of drinking water. *Mossy foot* was observed with great frequency in the almshouses and general population; its etiology is unknown. *Filariasis*, except for imported cases, is unknown in Jamaica, though the transmitting agent, *Culex quinquefasciatus* [*fatigans*], has a fairly wide distribution. A disease known as *neuritis* prevails and appears to be endemic. None of the cases show symptoms similar to those of the wet type of beriberi in the Far East. If VEDDER is correct in the opinion that the wet and dry types of beriberi are due to different deficiencies, this would account for the absence of the wet type in Jamaica. The author notes that beriberi does not affect the population of Barbados, so that a comparative study of conditions in these two islands might throw light on the nature of the neuritis of Jamaica. Data are given of the incidence of *vomiting sickness*, with an extract covering nearly four pages from an old report of Dr. H. Harold SCOTT [for this author's more recent views see this *Bulletin*, Vol. 6, p. 426].

Typhoid fever is common. In the year 1912, 259 cases were registered of which 85 came from Kingston. Other cases were treated in the district hospitals. The disease is endemic in all parts of the island. *Tuberculosis* is quite common, the poor ventilation of the huts tending to facilitate its spread. *Ainhum* is not uncommon. *Schistosomiasis* is reported as extremely rare. As regards *hookworm* disease, of 885 specimens examined from various parts of the island 80 per cent. were positive for hookworm ova (SCOTT). Of 1,376 short term prisoners examined 71·5 per cent. were positive. Only two showed any marked signs of anaemia. Opinion differs as to the effect this disease has on the population from an economic point of view. The author considers that the eradication of the infected in Jamaica would be a most difficult problem. In the *leper* asylum there are 111 inmates. Parasitic diseases of the skin are very common; those of most common occurrence are *tinea imbricata*, *ichthyosis*, *psoriasis* and *dhobi's itch*. A scaly marbled condition of the skin of the feet and legs, which is very common, is attributed to irritation incident to walking bare foot in the grass in the early morning hours when heavy dew is present.

A. G. B.

MACFARLANE (R. M.). **The Sanitation of a Small European Settlement in Portuguese East Africa; with Notes on some of the Diseases prevalent in the District.**—*Trans. Soc. Trop. Med. & Hyg.* 1916. Mar. Vol. 9. No. 5. pp. 129–156. With a map and 1 plan.

In April 1913 the author was sent by the Church of Scotland Blantyre Mission to open up a new station in Portuguese East Africa. The station lies about 160 miles east of the Nyasaland border and about 30 miles south of the 15th South parallel of latitude in the Portuguese district of Alto Mòlôcuê about 2,800 feet above sea level. A table

of temperatures and rainfall for 1914 is given. It is seen that the mean monthly temperature ranged from 65·1° (July) to 81·5° (December) and that the months May to October inclusive were dry. The district was first occupied by the Portuguese six years ago.

The first consideration in the selection of the site was naturally the freedom of the locality from the breeding places of mosquitoes. A map shows the relation between the position of the dwelling houses and that of the garden and the well from which the water supply was drawn; mosquito-breeding grounds are indicated. Mosquitoes were never numerous; the majority were Anophelines. Several cases of malaria occurred in the first half of 1914, the greatest incidence being at the end of the rains. One of the Anophelines appears to be *Myzomyia funesta*, shown by DANIELS to be the chief malaria carrier in Nyasaland. Parasites were always present in the station natives. On one occasion they were found in six out of 29. The author gives details of the measures taken to get rid of the mosquitoes. Oiling of the pools was not found practicable.

In order to get an idea of the extent and nature of the malaria he examined in January (mean temp. 80·2°) 84 children from the nearest village, two-and-a-half miles away. The results are given in a table. The ages varied from one-and-a-half months to fourteen years. Malarial parasites were found in 85·7 per cent. and palpable spleen in 72·6 per cent. Of the 72 positive blood slides 40·2 per cent. showed malignant tertian parasites, 59·7 simple tertian, 8·3 quartan. There were 10 cases of mixed infection and gametocytes were found in six cases. In the case of five children who showed no sign of malaria a leucocyte count was made (500 leucocytes counted). The large mononuclears ranged from 26·4 to 52·6, which, the author notes, is exceptionally high and undoubtedly due to malaria infection. He notes that at Blantyre simple tertian is rare, the malignant tertian being the common form. As illustrating the danger of diagnosing malaria from the presence of parasites in children he cites the case of a child he treated who returned on the following day with a smallpox eruption.

The faeces of 200 natives were examined for intestinal parasites and a table is given showing the number of ova of each parasite found. As the author had no hospital he had difficulty in obtaining specimens. Ova of ankylostomes were found in 97 per cent., of *Ascaris lumbricoides* in 64 per cent., and of *Trichuris trichiura* in 14·5 per cent. He notes that of 505 Nyasaland natives examined in Zomba by STANNUS 22·1 per cent. were found infected. If an estimate of the number of worms present may be attempted from the number of ova found, none of these cases were heavily enough infected to be prejudicially influenced. In the stools of ten cases treated he found a number of worms varying from 1 to 138, 14 or 15 being the usual number. In two of three of the more highly infected cases there was some anaemia. Both *A. duodenale* and *N. americanus* were present and in two cases a third species, probably *Triodontophorus deminutus*. As regards *A. lumbricoides*, he says that this parasite is very rare at Blantyre. An account is given of the hygienic measures, with a plan of the latrine used.

The conclusions are as follows:—

"In so far as the work recorded in this paper lends itself to the forming of conclusions, these may be summed up as follows.

"*Malaria.*—The endemic index of the district is over 90, and is probably 100. The commonest parasite appears to be *Plasmodium vivax*, the simple tertian form. Native children may harbour large numbers of parasites in their blood without symptoms.

"*Ankylostomiasis.*—At least 97 per cent. of the population harbour *Ankylostoma duodenale* or *Necator americanus*. The latter appears to be the commoner parasite. The majority of the population are merely carriers.

"*Ascariasis.*—Over 50 per cent. of the population harbour *Ascaris lumbricoides*—adults and children alike.

"*Trichuris trichiura.*—This worm is not nearly so common as the preceding one. It is present in small numbers in about 14 per cent. of the population.

"*Schistosomiasis.*—The urinary form of this disease is common, but the rectal form has not been found, locally contracted.

"*Taenia.*—Tape worms exist, but their frequency and species have not been accurately determined.

"*Oxyuris vermicularis.*—This parasite is probably widely distributed, at least in small numbers.

"*Spirochaetosis.*—African tick fever is probably not endemic in the district.

"*Trypanosomiasis.*—Sleeping sickness is not known to exist in the Alto Mòlôcuê district. Tsetse fly is sparsely distributed."

A. G. B.

Cavallini (Enrico). **Missione sanitaria ad Adalia.** [A Sanitary Mission to Adalia.]—*Ann. Med. Nav. e Colon.* 1916. Jan.–Feb. Vol. 22. Nos. 1–2. pp. 50–54.

Brief notes of a two-and-a-half years' stay by the author at the Turkish port of Adalia, or Antalia, in Anatolia. The town contains about 35,000 inhabitants, of whom 25,000 are Mussulmen, and most of the remainder Greeks. The situation is picturesque and the soil fertile; the water supply abundant, but polluted owing to municipal neglect. The sanitary conditions are those of most other towns under Turkish rule, that is to say, very bad, and disease is therefore prevalent, the author having treated as many as 22,000 cases of illness during his stay. The principal complaints are malaria, syphilis and other venereal diseases, trachoma, and tuberculosis. The Turks suffer much more from venereal disease than the Christians, from the majority of prostitutes being Mussulman in faith, generally married women, deserted or divorced by their husbands, and also repudiated by their own families. No prophylactic measures whatever are taken against the spread of phthisis, and of enteric the author observed as many as 250 cases during his stay. From what the author states, it would appear that an attempt had been made to establish an Italian medical mission in the place, which had to be abandoned on the outbreak of hostilities.

J. B. Nias.

i. Kermorgant. **Protection de l'enfance indigène dans les colonies autres que l'Algérie, le Maroc et la Tunisie.**—*Bull. Acad. Méd.* 1916. Feb. 3 ser. Vol. 75. Year 80. No. 7. pp. 178–195.

ii. Pinard (A.). **De la communication de M. Kermorgant sur "La Protection de l'enfance indigène dans les colonies autres que l'Algérie, le Maroc et la Tunisie."**—*Ibid.* Mar. No. 13. pp. 346–352.

i. The author begins with some general observations. He points out the wonderful results of vaccination against smallpox in Cochin

China. In 1885 the population of that country was estimated at 1,790,000 ; in 1896, after vaccination had been carried out on a large scale, it was 2,262,000 and in 1908 4,000,000. He adds that this is one of the most thickly populated French colonies. He points out that in Annam, Madagascar, Oceania and West Africa there are no such things as foundlings. Any child without parents is brought up by someone else in his village. The death of children is often caused by ignorance or lack of skill on the part of the mothers. The midwives are very dirty and very ignorant. Lactation goes on to the second, third, fourth or even fifth year, but a few days after birth the infant gets rice, manioc, yams and bananas, chewed and passed from mouth to mouth, a proceeding which, as he points out, conduces admirably to contagion. Thus numerous infants born healthy become victims of tuberculosis, syphilis, etc. The solid food also gives digestive troubles leading to athrepsia. In many of these countries the infants are almost naked and insufficiently protected against variations of temperature. He proceeds to pass in review the attempts made to check the mortality amongst children in the various French colonies, giving incidentally the causes.

Madagascar.—Before the French occupation syphilis and malaria caused many still births and with tetanus occasioned great mortality amongst infants. The three diseases which were more recently chiefly responsible are those of the respiratory passages, smallpox and malaria. In the interior the thermometer goes down in July and August to zero and the children are insufficiently protected ; not infrequently father, mother and one or more children living in a badly ventilated hut are attacked by pneumonia at the same time. He draws attention to the habit on the part of the attendant of receiving the sputa into his hands. Smallpox and malaria are now dealt with in appropriate ways.

In 1898 the infantile mortality up to five years was 40 per cent. of the general mortality. The following measures were taken :—Regularisation of marriages and severe penalties for repudiation ; a tax on the unmarried not contributing to the subsistence of a child ; exemption from taxes of fathers of five children ; exemption from military service of all fathers ; the institution of an annual fête when gifts were made to the mothers of the largest families. In 1912 475 mothers with eight living children apiece were rewarded. A school of medicine for natives was formed ; hospitals, dispensaries, and orphanages were started in all the provinces. Other medical measures are detailed. Syphilis, and consequently abortion, was extremely common at that time ; infected women were estimated at 90 to 95 per cent. When it was found that with specific treatment women who had previously had several miscarriages went to term, many of them came for consultation and also brought their husbands to be treated. In 1903 lying-in hospitals were started (in 1909 there were 72), and a corps of native midwives was organised ; of these there are now 72.

Indo-China. From 1627 onwards schools, hospitals, dispensaries and crèches were founded by the missionaries, especially in Cochin China. An account is given of the numerous homes, orphanages, schools,, crèches, lying-in hospitals, etc., started since 1853. The lying-in hospitals are considered the most useful. A school for midwives was recently formed. Measures were taken to prevent tetanus

from infection of the cord, the principal cause of the mortality of infants in that country. Other causes are given as, enteritis due to improper diet, stuffing with chewed rice, and epidemics of cholera, malaria, plague and smallpox. It is noted that the infantile mortality reaches 15 per cent. in the first month and 40 to 50 per cent. in the course of the first year.

Similar details are given for *Martinique, Guadeloupe, French Guiana, Reunion* and *New Caledonia.* In the last colony there is a committee which gives a prize of 10 francs for every living baby born in the colony. It is noted that leprosy affects a fifth part of the native population. A large number of European and native children are attacked and it is a common thing to see leprous children share a bed with their healthy brothers and sisters. In this colony the birth-rate is low and sterility is often produced by attempts at abortion. Marriages are made very young.

After some remarks on *Tahiti* and the *Marquesas Islands*, in which the population seems to be disappearing, the author comes to *Senegal.* Here infantile mortality is attributed, amongst other things, to the disastrous practices of the marabouts and native midwives who, by their want of skill, often make it impossible for the mothers to bear more children. Diarrhoea, insufficient clothing and improper feeding are said to be powerful factors in the infantile mortality.

Upper Senegal & Niger and *Mauritania* are next dealt with and then *Equatorial Africa.* Here no preventive work is being done and there are no statistics. The death-rate and birth-rate vary very much in different parts of the country. Prolonged lactation, polygamy and abortion are given as the most frequent causes of sterility, with marriage before completion of development.

French Possessions in India.—The number of infants who succumb in the first eight days to convulsions is large. These are due to tetanus acquired through improper treatment of the cord, which is dressed with clay or cow-dung. Other causes of mortality are given as diarrhoea, smallpox, cholera, malaria, round-worms, tuberculosis, syphilis. Still-births are given as 22·5 per cent !

ii. Pinard, who discusses M. Kermorgant's paper, confines his remarks to Madagascar and Indo-China. He attributes the measures taken in Madagascar to General Gallieni. He states that at Tananarive in 1901 eight medical inspectors were appointed for young children and pregnant mothers. There were weekly consultations for these and for women with venereal diseases or diseases peculiar to the sex, to the exclusion of all other persons. He points out that French towns might copy the example of Tananarive, where for 15 years children have been protected both before and after birth. The inferior results in Indo-China are attributed to defective organisation. At Tananarive (population in 1911, 70,000) in 1900 the birth-rate was 38, in 1901 45, in 1902 47 and in 1903 51 per thousand inhabitants. This is contrasted with France's 25 per mille.

A. G. B.

Barry (C.) & Crump (S. T.). **Notes on Emergent Abdominal Surgery.** —*Indian Med. Gaz.* 1916. Feb. Vol. 51. No. 2. pp. 50–58.

The authors, who are Medical Superintendent and Assistant Medical Superintendent, respectively, of the Rangoon General Hospital, give

figures representing the "emergent abdominal surgery" performed on native patients at that hospital during the last five years. A table shows that there have been 433 such cases, of which the chief items are :—

Strangulated hernia	141
Acute appendicitis.....	106
Penetrating abdominal wounds	50
Acute general peritonitis	48
Internal intestinal obstruction	46

The authors note that hernia is by no means uncommon amongst the coolie classes. During the last five years 546 operations for the radical cure of hernia have been performed. The great majority of these cases were Hindu coolies from Southern India ; only a very few were Burmans. Inguinal hernia formed all but four per cent. of the cases.

As regards internal intestinal obstruction the most frequent causes were bands, 20 cases ; volvulus, 11 ; intussusception, 8. No case of the latter was met with in natives under the age of 20. It is noted that out of 669 cases of intestinal obstruction collected at the London Hospital intussusception claimed 189 or 28 per cent. The authors in an experience extending over 18 years cannot remember ever having been called upon to treat a case of this mishap among native children. They note that native mothers universally suckle their children and often for a period of two years or more which is possibly a factor of importance. Only four cases of obstruction were due to organic stricture. "The intestinal tract in natives, except at its very commencement and at its extreme end, appears to enjoy remarkable immunity from cancer." Out of 5,946 occasions in the last five years when the intestinal tract of natives was thoroughly explored either by operative measures or on the post mortem table, in only one case was cancer discovered other than that of the stomach or rectum. Lt.-Col. Niblock is quoted to the same effect. The authors contrast this with the statistics from England. Out of 669 cases of intestinal obstruction at the London Hospital no less than 151 were due to cancer. The authors ask if there is any explanation of the immunity from cancer of the intestinal tract in natives. They assign, as at least a predisposing cause of cancer in this region in Europeans, stasis of intestinal contents, and think that stasis is uncommon amongst natives. Constipation is rare and the intestinal tract is thoroughly emptied. But this opinion is expressed with diffidence.

There were two cases of intestinal obstruction due to balls of round worms. They think that a course of anthelminthics should be given to all patients about to undergo a set operation on the intestinal tract.

Appendicitis, as the figures show, is by no means rare in natives, but whereas in London 40 per cent. of cases occur between 10 and 20, in the natives at Rangoon nearly half the cases occurred between 30 and 40 and only four per cent. between 10 and 20.

The authors are of opinion that ulcer of the stomach and duodenum is decidedly more common amongst natives of India than their operative statistics indicate. They lay stress especially on the important

surgical aspect of chronic dysenteric ulceration as a cause of general peritonitis. In the last five years deaths from peritonitis have been associated with the following dysenteric lesions :—

Acute gangrenous amoebic dysentery	36	cases
Perforated amoebic dysenteric ulcers	4	,,
Ruptured liver abscess (amoebic)	2	,,
Abscess about sigmoid flexure, probably amoebic	2	,,
	44	cases

They mention also the simulation of appendicitis by large chronic dysenteric ulcers of the caecum and the production of severe intestinal haemorrhage subsequent to some abdominal operation, controlled only by prompt use of emetine injections. The surgeon, they write, will do well to weigh carefully the importance of a history of an attack of chronic dysentery before deciding upon an abdominal operation. The paper contains several valuable tables.

A. G. B.

Baetz (Walter G.). **A Number of Surprises for the Diagnostician as Revealed by the Pathologist.**—*Proc. Med. Assoc. Isthmian Canal Zone.* Apr.–Oct. 1914. Vol. 7. Pt. 1. [1916]. pp 126–138.

These were cases admitted to the Ancon Hospital, Canal Zone, which came to autopsy. One or two passages are worth extraction. There were four missed cases of entamoebic abscess of the liver, a disease which the author says is the bane and fear of the internist. He writes :—

" One is impressed with the variety of conditions for which hepatic abscess is mistaken. This is not surprising when we consider that there is no definite symptom complex of this curse of the tropics that is not found more often in other causes of hepatic enlargement. Until diagnosis by röntgenology and a serum ferment test become practical possibilities, there will always be cases slowly dying under our very eyes, in whom past history as to dysentery, temperature records, physical examinations, the absolute and the differential blood count, stool examinations, aspiration of the afflicted organ, and even exploratory laparotomy have deceived us."

There are several cases which illustrate the danger of attributing a patient's illness solely to malarial parasites that may be found in his blood, in those parts of the tropics where practically all natives harbour parasites. Here is one :—

" A tropical negro boy, seven years of age, was admitted in a semi-comatose state. The history given by the mother was that he has been sick for three weeks with palsy of the left arm and leg. Ten hours before seeking hospital treatment the boy had begun to vomit and had lapsed into semicoma. When roused he spoke disconnectedly and in a decidedly slurring fashion. The white blood count was 13,600. The thermometer registered 100° F. After a tedious search, estivo-autumnal parasites were found in the patient's blood. One reads a good deal of pernicious malaria producing local palsies and hemiplegias but the pathologist usually finds a better explanation for such definite focal signs. Keeping this bit of experience in mind, the patient was subjected to a spinal puncture in addition to being treated for pernicious malaria. Although the cerebro-spinal fluid proved negative both in culture and cytology, the pressure was so decidedly increased that when the patient died on the third day, a

diagnosis of simple meningitis was given preference over the malaria diagnosis. The autopsy brought to light a cystic parencephalus involving the pons, crus cerebri, medulla, and cervical portion of the cord. Internal and external hydrocephalus were marked. A chronic malarial infection with a few parasites in the spleen and the bone marrow was found, and the possibility of another delusion concerning malarial hemiplegia had been dispelled by the pathologist."

A. G. B.

STRONG (W. M.). **The Causation of So-Called Tropical Anaemia.**—*Trans. Soc. Trop. Med. & Hyg.* 1916. Jan. Vol. 9. No. 3. pp. 97–100.

Persons who have lived long in the tropics become anaemic looking. This is not due to deficiency of haemoglobin nor is it probable that ischaemia of the skin capillaries is the cause, as has been suggested. The author first discusses the optical factors which influence the colour of the skin. The colour of an object depends on the relative amount of each colour of the spectrum which is reflected back to the eye of the observer. The colour of the skin is judged by the light which is scattered by its various layers—the outer epidermis, the pigmented layer, and the true skin with its blood vessels. If either of the outer layers stops light of any particular colour, that colour does not reach the deeper layer and hence cannot be reflected. The author argues that in so-called tropical anaemia less red light than usual reaches the capillary layer and the reason, in his belief, is that the epidermis becomes partially opaque to red light by the deposition in it of pigment. As more pigment gets deposited the skin becomes yellow-brown.

A. G. B.

Reprints and Pamphlets received :—

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SEGALE (M.). Metodiche di accertamento batteriologico su vasta scala. Nota 1.—Portatori di colera e terreno Aronson.—*Giorn. Med. Milit.*, 1916.

SMITS (J. C. J. C.). Mededeelingen uit het Centraal-Hospitaal der Sennah Rubber Company, Ltd. te Bila (Oostkust van Sumatra). IV.—Klinische aanteekeningen op de jaarrapporten over 1914. Malaria, Dysenterie, Kala-Azar, Beri-Beri, Pellagra.—*Geneesk, Tijdschr. v. Nederlandsch.-Indië*, 1916.

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WOLBACH (S. B.). On the Filterability and Biology of Spirochaetes.—*Amer. Jl. Trop. Dis. & Prevent. Med.*, 1915.

WOLBACH (S. B.). The Etiology of Rocky Mountain Spotted Fever (A Preliminary Report).—*Jl. Med. Res.*, 1916.

WOLBACH (S. B.), CHAPMAN (W. H.) & STEVENS (H. W.). Concerning the Filterability of Trypanosomes.—*Jl. Med. Res.*, 1915.

Note.—On direct application (not through agents or booksellers) any of the foregoing reprints or pamphlets will be sent on loan to any part of the world, the Bureau paying outward postage.

Books received.

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The Bureau Library is indebted to Lt.-Col. J. H. Tull WALSH for the gift of Vols. 25, 26, 27, 28 and part of 24, of the *Indian Medical Gazette.*

The Director points out that the Bureau has hitherto failed to obtain the following volumes of the *Indian Medical Gazette*: Vols. 1-23, and that Vols. 24, 34, 35, 36, 37, 38, 39, 40, 41, 42 and 43, lack one or more numbers. He will be glad to purchase any of the missing volumes or numbers of this valuable journal.

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